

The Science of Wealth.

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Written at Ozaukee, Wis., Feb. 1873.

Printed April, 1876, by Albert Scholl.

Wealth is the embodiment of days of labor. \$1.000 dollars will represent 1000 days of labor performed; say three years of labor. \$10.000 would hence represent 30 years of labor. A man beginning to earn at 20 years of age could at the end of 50 years have a possession equal to 10.000 dollars.

100.000 dollars represent 300 years, and one million dollars represent three thousand years. A man's working life we will call thirty years, therefore it would take one thousand men working thirty years before their united savings would amount to one million of dollars. Or three thousand men for ten years.

10,000 dollars could be made by thirty years saving but no more; hence in order to obtain wealth the labor of other persons, or their equivalent, has to be called into requisition. One man has also to control the labor of a great many and thus it is that the person wishing to gain wealth must be brought up to and able to govern.

Government is also an important element in obtaining wealth; without this no wealth can be secured. Government may be effected by a despotic rule, or by interest in the affair. Self-interest may be the most powerful stimulus to the wise and aged, while despotic rule may be in connection with interest the best means for youth and ignorance.

The labor of others is at all events necessary. But these labors must bear the stamp of production over and above consumption. A family consumes value, it should therefore reproduce an equivalent to its consumption. Labor should consequently be apportioned to the men-

tal or physical abilities of the individual. The effort to be made must not be in excess of the capacities of the individual, if the laborer can accomplish the task, pleasure and satisfaction will be the result.

Happiness lies only in accomplishing, in conquering, that is in the satisfaction of our desires by moderate not excessive labor. Every laborer ought to have this granted him. Hence the man of wealth has to understand the wants of his subjects. He must understand human nature and must positively but with mildness govern by despotic rule and interest as the case may be and see them carried out. In every subject a sphere of independence should be created; though subject still, that in this sphere he will labor without supervision. Supervision must not be relaxed until the labor has become a habit with the person. Still an occasional unthought of supervision is absolutely necessary, in order to let the subject know that it is still necessary to be wary. Laborers have also their diseases and it may sometimes be difficult to heal them. The great dissatisfaction shown at the present day in the numerous strikes points clearly to this.

A bodily disease is cured by making a very powerful impression on the nervous system, when the will is laid dormant (Albert A.) and then letting said power slowly come into play again.

The horse is cured of his tricks by being completely overcome by the dextrous application of the fingers. So strikes are cured by the approach of starvation. Every action produces an effect, so a diseased motion will set up a tendency to diseased motion and the liability to a return of the disease is very strong, remember this, the tendency will ever remain and make a conquest. Every action, even if rebutted will make a conquest. No action can be fruitless and if sufficiently continued will lead towards success.

The right place is a necessary element of success. This may be nature's favor, but often has to be hunted like the diamond. Where a produce or a service is wanted there it will be worth the most. A place increases in value by age in consequence of an increase of population (giving rise to increased demand) just the same as with real estate. Buying a place now in this Town would be cheaper than some years ago, paying the same price. — A good place represents capital, because it took capital to obtain it, and this capital will bear interest in the degree of the demand; the same as in real estate. What we gain in this case is the gain of our capital, not the gain of our labor.

Learning a Profession takes capital, hence the professional man earns no more than any other, but it is the capital he uses that he has a profit on. We will say a physician studies five years, that would be an equivalent to: \$15,00.

Boarding at three dollars per week. 7,50.

Tuition and Books. 7,50.

This would constitute a total capital of \$3,000.
dollars to start with.

This capital alone would also be worth at starting \$300 income, after one year \$330; after 2 years \$363; after 3 years, \$400; after 4 years \$440; after 10 years \$850; after 12 years \$1,000. The income alone ought to be worth also without any further earnings \$1,000 a year. Adding the whole income to the principle we have after 10 years, \$9,400, and after 12 years, 11,375 dollars worth of property.

Now my united effects do not equal that amount. In order for a business to be profitable there ought to be a demand for its productions and that demand must be renewed at short intervals. Three thousand acres of Peppermint would supply the whole world, it could hence not be a very profitable business. The more imperative

our wants are, the more profitable it is to supply them. In a primitive people are primitive wants, hence their wants are more circumscribed and it is less profitable to supply them than when people have arrived at a stage of civilization. Food, Warmth and Society are the most primitive wants. Food, drink, warmth, clothing, decoration, health and exhilaration will do for a primitive people, while literature, food, health and decoration of the mind are additionally necessary for the civilized world. Thus we have Producers, Manufacturers, Merchants, Bankers, Governors, Priests, Physicians, Teachers, etc..

An **Industry** in order to be prosperous must spring up in a congenial clime and fertile soil regarding itself. There must be natural advantages, as to the people, the communication, the locality, the ease with which raw materials may be obtained and the cheapness of labor. Whether male or female labor is required. Whether great intelligence is necessary or not. Whether the right people to consume the article live near or within reach. Iowa where corn is cheap would be the place for making Grape-sugar. Where boys are cheap the place for making glycerine. In Wisconsin Potatoes might be used for sugar. Beets of course could be raised in Wisconsin as well as anywhere and since land is cheap it might pay.

A **Beet root Sugar Manufactory** would answer in any agricultural district where labor was not too high and where there was communication with the world as well as a fertile soil. This we have in Wisconsin just as well as any where in the world. Iowa might indeed present some more favorable conditions but labor might be cheaper in Wisconsin.

Carrara is the worlds market for marble, from nature. So is Pennsylvania for coal and iron. Lake Superior for iron and copper. California and Australia for Gold.

Peru and Mexico for Silver. — Port Washington has its clay for bricks, and its limestone for lime, its building stone is rather lying too deep. Waubeka might have its lithographic stone. Our advantages are consequently a cheap production of beets, potatoes and hogs, hops did not pay. Barley will do only for malt. Corn cannot be raised enough for any purpose. Further we have only clay for bricks. Dolomite for making magnesia would not pay. The iron at Decker's would not pay when it can be got in Lake Superior with far less trouble. Limestone is not a great building stone therefore it will hardly pay. There is no coal, no salt, no metals here hence the produce of the farm must establish the manufacture, especially a manufacture where the raw materials cannot be transported, as beets etc., when carriage would entail an extra expense. New York or Massachusetts could not claim such a manufactory. The weight of the article is here a natural protection and so is its bulk. In order to carry on a manufactory fuel is necessary. We must also have cheap wood or coal. The coal would evidently be too dear, we must also hold on to our swamp for wood. Manufactories can also never be carried on to a great extent because Wisconsin has no coal and its wood is being cut down, its manufactories come too late.

The natural advantages of Ozaukee are hence very small since only manufactures requiring little fuel can be tolerated.

Here we may class the manufacture of Alcohol from potatoes, also Vinegar, also artificial Wine and Mustard. Barrels could be got cheap as yet. — Patent medicines cannot be successfully made, because:

1. The bottles have to be got from Pittsburgh.
2. The labels from New York, and last but not least, the enormous advertising necessary to sell.

Such medicines could only be made locally to advantage. To the gen-

eral Market New York would give great advantages. Of course for a local market the respective locality will always retain the advantage; because the bottles are brought empty into said locality, cost also less freight. A Chemical Manufactory would pay only in regard to certain products. Chloroform could not be made since we have no black oxide of manganese. No sulphate of iron, since we have no pyritis. Concentrated Remedies like Keith's, or fluid extracts like Stearn's might be made here to advantage. Extract of malt or ale could be made here as well as anywhere. Perfumery would not pay for our own population, it would have to be prepared for outside consumption, in this case it is too cold. Kansas would answer better. Mignonette and roses could be raised.

The Southern States presented natural advantages for raising sugar and cotton so as to become the world's Market. Slave-labor was cheap and the soil and temperature most favorable. Iowa might compete now with its Surgham. Wisconsin was unsuccessful.

In order to take hold of a Manufacture we must ask, will it pay the best? Is it something what has been tried in other places or is it only experimental? Are all the conditions within one's reach? It would be a culpable speculation to commence something on a large scale entirely experimental; where the labors of others could not be taken as a guide. In order to insure success it takes a great many failures, let others make those failures. Where one will win, ten will lose, it is only many failures that insure success. My ink for example. Again it would be very imprudent to undertake anything when one is not master of the situation, trusting to others will soon bring ruin at the door. (Brabender and the swamp.)

It takes a thousand experiments before success can be counted on, and then the advance in what has

been done is only very slight. In my ink it is the citrate and acetate of Alumina. Strike into the beaten track and keep this in mind when looking for a more propitious bye-way. The proto sulphate of iron, galls and gum are an example.

Galvanoplastic manufactures might probably be conducted as cheap here as anywhere else, of course one has to look for a different market than Ozaukee County; and in other places there may be a supply.

The most profitable manufacture in this place would be the manufacture of Aluminium direct from clay by means of electricity, produced by bringing together different conducting mediums, or mediums of different temperatures, say ice and the deep ground, or by turning steam or caloric into electricity for the purpose of decomposing the clay. Such is only a speculation.

The waves of the lake might possibly be used either by their lifting power or their propelling power for driving machinery.

Wind will also do some work here in Ozaukee as well as elsewhere. The cold of winter would answer very well for freezing wine for the purpose of clarifying the same, throwing down the bitartrate of potassa, forcing crystallization also of many other things as carbolate of potassa, etc..

Ice might be used as a filter; also for keeping butter, eggs, and preserves. Ice is a natural and plentiful substance of Ozaukee and might be used in manufacture successfully. In the selection of an industry we must look to the Natural Advantages of the Locality.

Artificial Sugar.

The vegetable cell is undoubtedly the laboratory of sugar, so is the liver cell. The material it is made from can be nothing else than water and carbonic acid in the presence of acids and may be ferments.

Why cannot these same conditions be supplied without the intervention of living cells? Suppose we take Sulphide of carbon and water and submit the same to great pressure? Or heat the same in the presence of iron to abstract the sulphur leaving the carbon at liberty to combine with the water?

Evaporation should be carried on in such a way that the product would come out finished at one end of the apparatus while it is passed in at the other.

Aluminium.

Scientific American, vol. 1, page 5, 1865. A more volatile chloride than the chloride of Aluminium is that of Antimony, Arsenic, Cyanogen, Mercury, Zinc and Tin, therefore these metals will reduce the chloride Aluminium. M. Basset uses 4 parts of Zinc to 1 of chloride of Aluminium.

S. A. vol 2, p. 154, 1864. Chloride of Aluminium is reduced by Zinc in the presence of chloride sodium.

S. A. vol. 2, p. 130, 1864. The double chloride of Aluminium and soda is first formed, then reduced by sodium using cryolite as a flux.

S. A. vol. 2, p. 202, 1863. Aluminium Bronze, 10 Aluminium and 90 copper.

S. A. vol. 2, 1861. Working Aluminium. Melts above Zinc.

S. A. vol. 1, p. 345, 1860. Prepare the sulphide of Aluminium by passing sulphide of Carbon over red hot Alumina. Take sulphide of Alumina and such a proportion of sulphate of Alumina as will form sulphurous acid when heated which volatilizes leaving the Aluminium. Or pass hydrogen over the heated sulphide of Aluminium.

Druggists' Circular, page 137, 1866. Aluminium and Alumina.

D. C. p. 34, 1867. Aluminium is a metal in its passive

state while sodium is in its active state.

D. C. 1869, page 84-91-102.

" " 1870, page 75. To soft solder add one third, one fourth, or one-eighth of Zinc amalgam and you can solder Alumina. — 103. Working alumina. Take 80 parts of Zinc, 4 of copper and 8 of alumina for a solder.

Manufacturer and Builder, page 216, 1872. Aluminium is four dollars a pound, is not manufactured here. Melts at 1500 degrees.

M. B. page 149, 1872. Separating silicate of Alumina; fuse with bisulphate of Potassa to form alum. Would bisulphate of iron do?

Experiments to be instituted.

No. 1. Heat clay, ashes, and limestone to get an aluminate of Potassa and silicate of Potassa. If done under pressure carbonate of Potassa might be formed by the carbonic acid of the lime and the silica set free as well as the alumina. We might have carbonate of Potassa, Silica, Alumina and Lime.

No. 2. Chloride of Alumina might result by subjecting clay, silicate of Alumina when heated, to chlorine. The chloride of alumina subliming leaving the silica behind.

No. 3. For Preparing Aluminium, it might be tried to subject common clay, in company with fluoride of calcium, common salt and charcoal, to a high heat, and thus obtain the double fluoride of Aluminium and sodium.

Pursuit of Wealth. —

At first comes the hypothesis. A project is to be made taking favorable conjunctions of circumstances into account. 2. The application of the Experimental method (no other way is sure, all others may lead to failure).

Every step must be examined and proved to be remunerative.

3. A most frugal expenditure, (a husbanding of all resources). Expenditure must be made for necessary and most improved tools. Tools that find application. A tool or building must be in proportion to the actual, not possible or even probable use to which it may be applied. My lathe does not pay, and so it is with my watch. My lathe being a speculation it may in the end pay by the instruction imparted. The watch will never pay, as a tool might pay before erecting an extensive factory, on an expensive scale, and the faulty arrangements of which might lead to ruin. Mistakes made in selling the sewing machines.

The extra dozen was bought on the recommendation of Brabender and Obladen. Brabender is a man of no veracity, Obladen a man of loose principles. Their talk may sound very alluring but their achievements in acquiring the comforts of this world, stamp them as not to be depended on.

Obladen does not pay his debts, why trust him for more? Brabender does no better besides he may lie and cheat. He did so going with the auctioneers in Town Twelve. Why trust him to oversee the wood business? A man that is not religious and has also no honor, has nothing for dependance left. A man of loose habits may mean well at first, but after he gets involved he gradually acquiesces and excuses his weakness, his honor sinks, and his promises are no longer kept. In this case we did not oversee the business ourselves and trusting to Brabender and Obladen we were cheated. Further by letting these men have the machines on credit even by telling them that the credit was only for a few days we became involved. Where a man comes short of his engagements at the very start he surely cannot be trusted. Bad habits are a second nature and there is no use

in attempting to reform such a person except at a loss: — Obladen has been prevailed upon a number of times to reform but he is the same drunkard to day. Poverty even is not able to cure him, much less anything else ! Pw's honesty must be nearly shipwrecked, having clerked with dishonest traders, having acquiesced in foul dealings and falling off in the observance of religious customs.

4. We ventured too much on a business not yet established.

We did not feel our way, we were not cautious enough. We trusted to the first excitement of an inflated or artificially created selling, what must fall off again as soon as extra exertions are left off. The first excitement must be let pass before the true state of an affair can be told.

There will also be a reaction against such or any undertaking if it only clashes in the least with the interest of others, such men will run it down, as Young did; 2nd leaving off strenuous exertions, 3rd. The excitement of the people passing off. People are very forgetful, the excitement must be slightly varied but renewed some way or other. — Be sure what you do that it is right and best. Not too much need be said at once before the people but they want to be kept in a waking condition all the time.

4. A mistake was, ordering a dozen machines to save freight, that is trying to have a large profit. As the business was not established it was imprudent to aim at a large profit. It is always best to pay the insurance money as long as there is risk.

Now, our principle ought to be, to cut our losses short, and close up the business. The large machines were got as a competition (be very guardful of the cause there is danger ahead of failing as soon as the passions become aroused). One machine only ought to have been bought and the necessary examinations made. — A clerk

must possess Honesty, industry and a bright intellect. —

Money. —

Money is the counterpart of all values in life. Power, knowledge and virtue seem at this day to find practically a balance in money. Knowledge, if it produces no value, is worth nothing at all. The current acceptation seems to be "whatever is expedient and profitable is right, and the Almighty Dollar is king." Very few persons there are at present that will do a thing just because it is right, and in spite of it being unprofitable to them. Behold the editors of to day how they fill their papers with advertisements of a most shameful character, defrauding the people of their money, health and morals; just for pay.

It is natural and in accordance with the law of self-preservation to strive to attain as much as possible of this equivalent of values. Every body craves his personal aggrandisement and money is an equivalent to it. — Money is made by supplying the wants of other persons, these wants may be divided into wants of the body and wants of the mind. Or into wants which further our existence: as food and drink, house and clothing and protecting us against disease and violence, and secondly into wants which further our enjoyments; as, learning, position, love and warding off disappointment, ill success, anger and enmity.

These wants have to be supplied from an extraneous source, a source outside of man; nature has therefore to be attacked and whatever can be got, appropriated. Man has also to combat the world outside of him. One man subdues the forces of nature and the inferior animals, as is done in agriculture and manufacture, while the other man subdues his like by pressing him into his service, by enslaving him or by paying him his livelihood, or by

subduing him through the powers of his mind, as is done in preaching and the learned profession. The first method is physical, the second mental. The most honorable way of human dealings where a man returns more value to his subject than he takes from him. What is called profit is a species of robbery. Advantage is taken of the wants of others and the inability or ignorance to supply these wants, and a profit is taken for the knowledge or power imparted more than its real value. Thus one man lives at the expense of another, and although the picture is less disgusting than we behold in the depths of the sea, it is nevertheless, none the less real. Profit is accordingly an equipoise of ignorance and inability. Ignorance paying the larger part of profit. Selling goods to people the real value of which they do not understand would be a species of cheating, commonly practiced at this day; and for a transaction to be honorable, the buyer must receive, at least to him, an equivalent to the money value paid.

— Ignorant people, though they have but few desires, have the desire to get rich in common with people in general and thus they get duped in this direction, in buying what they do not understand, expecting a great profit but which turns out to their loss in the end. One man's loss is another man's gain. This is strikingly illustrated in the case of John Dr—— buying the quarry. Had he known the real condition of the quarry and the labor and expense connected with it before he could hope to make a cent, he would have recoiled from it with horror.

— We see further in the case of the Factory of Schuhmacher & Johnson how crazy ignorant people are, and how anxious to get rid of their money when a large shadow of profit is held out to them. Fools and their money are soon parted. After the people had been swindled by the Railroad, and by the Factory, they

would still subscribe \$ 30,000 for the Lake shore road, which put the rope of perdition around the neck of Port Washington. Any other enterprise could readily be started here in Port Washington, provided the gold was alloyed with plenty of copper, the shadow must be made gigantic although the merit be but small. A really good thing cannot flourish among the ignorant classes because they expect too much and when something great, although small, is presented to them they are readily allured and drawn away. The acute swindler manages better than the concientious teacher of wisdom.

— To supply the wants created by our bodily existence would be an easy affair, and require but little of our time, but the wants created by the corporate body called society, and of which we are a member, other and and greater wants are brought into play, to supply which, we have to make use of the greatest exertions man is capable of. Our physical, moral, intellectual and social nature, each have their wants and bear heavy on the present generation.

To succeed in an undertanding the same rule must be observed as when drilling a hole in a rock, that is keeping the drill in one spot.

Gold and Silver is a species

of barter; while Notes represent the credit of the people or the ability of the people to pay. The people issue the Notes by some kind of Stock contribution, which they hold themselves ready to pay when called on, through the Agency of the Government.

The people have to pay their stock when they pay taxes. Although they pay these taxes in the same kind of Notes, the Notes represent days of labor when in the hands of the people. People can only get them by giv-

ing days of labor or their equivalent in exchange.

I could issue Notes where I would promise to pay on demand fifty cents or one dollar in medicines or services to the bearer of said Note, receiving therefore money or labor which I might put on interest. My Notes bringing no interest:

The people could pay me thus with my Notes. I might also issue delivery tickets which people might buy in advance and thus secure my services.

My Policies are really a species of money, based on my ability to do services. If I would issue my delivery tickets for fifteen dollars and have them sold by my agents for ten dollars cash, there might be an inducement for people to buy readily. To sell such Notes readily would be to have them inflated sufficiently and then sold below par.

Now here I ought to have a bank where these Notes, Tickets and Policies could readily be bought even at a considerable discount. The Ticket System of the Chicago Wunderdoctor demands consideration.

Cesundheits Bund.

(Health-league.)

1874.

Creation :

Creation has first the Will, the Embryonic stage and finally the delivery or birth. After birth the object requires great nurturing; to be protected from evil influences, and to be subjected to those that are beneficial. Here are two sides to be guarded. The enemies have to be fought and annihilated, the friends to be encouraged, protected and increased. Thus everything has in reality two sides, there is also in the nature of everything a Duality. Nothing new can be originated, except from a quality of circumstances. A Heterogenous medly is ne-

cessary to the development of anything new. If every-thing was a homogeny then nothing could arise.

The birth of a thing is of great importance, if it is born too soon, the infant may not be viable, or if viable, be sickly and will not thrive. It is necessary that the new creation should be well matured so that it may be able to stand the shock of delivery and the new influence of temperature it is subjected to. In delivery I have to manipulate coolly, carefully and tentative from one side to the other, still bent on my purpose of a direct result, I have to move the forceps to one side and then to the other and it is only by repeated efforts that the final result is obtained. No direct and forcible impulse will do, otherwise an injury will be the result. The injury results to the object to be born.

The object to be attained may be sacrificed by the use of violence.

It takes time before an impression is felt. It takes time even for the mind to perceive what the eye beholds, that the effect of an impression is not immediately felt. There is no immediate result because the impression was not felt, not comprehended, not heeded. After the impression is felt we make an impression on the other side and wait until it is felt, this will positively establish what was impressed on the first side, now we make an impression on the first side, and wait for another impression, and so we continue, slowly, gently, alternately and persistantly to work and we will finally have the pleasure of having accomplished our end. We may add another element in the plan, namely progression, that is after a certain effect has been attained then we may somewhat change our tactics in making more rapid impressions and larger movements, as the ease with which they may be effected becomes apparent. To be successful also in any creation whatever, it is necessary to adopt the following aids

as friends of the creation, without them nothing will succeed; they are: — Time, Gentility, Alter-nacy, Persistancy, and Usury. — Usury is using the capital on hand to obtain more; Money to obtain interest; friends to obtain influence or popularity; the powerful for obtaining dominion. — **Let your profits run on, cut your losses short.** We must appease our enemies if they have our mastery; we can quell their efforts by a powerful and exposing opposition. Life is a battle.

The creation of a thing has a propitious and unpropitious time, the first will tend to foster the creation, the latter will oppose it.

Regarding the Health-Union.

No Dr. but me and H—— going off would be propitious for establishing it, but at present money is scarce. If the advantages of the present could be conjoined with the advantages of time then the whole would be complete.

With a person of good understanding I could take a note and thus induce him to join far more easily. Persons can be induced most easily by small increments.

Time: —

To make impressions it takes time, but one impression is really evanescent. An article in writing will last no longer than one week or a month at most, then the impression will be forgotten, others will have taken their place. Persons that responded to my call were reminded repeatedly by their ills of the need of my services, thus the impression created was constantly kept up and renewed. If patients did not have the coal on their foot no one would come. There is also a general backwardness, a shortcoming, inertia of matter or "Tragheit der Materie." Every effort is a beat, a pulsation, to make a slight impression, soon to be forgotten and to take the place of another pulsation.

Gentility.

A horse cannot be made to pass an object it is afraid of, better than by letting him examine it. It does not know the object, it is afraid, but if after an examination it finds there is no danger, then it ventures a little further. Everything new may be considered on the same basis as vice is at present, and the same saying applies to it. "Vice is a monster, etc."

Not much ought to be demanded of the people, after that is obtained, then a further advance can be made and probably a greater demand put forth. Roughness will not do, this might close the door behind us and that we must by all means endeavor to keep open. After a man's favor is once lost it is impossible to regain it fully. We may be perfectly right, but to tell that a thing is right takes a process of reasoning, which process is not developed in most persons at all, it is also not through a process of reasoning that people can be reached, it must be baser sentiments that can be prevailed upon. —

Alternady. — Right and Left. — Motion and rest. The pendule moves to one side and then to the other. It is motion both ways, but opposite motion. Anything not in a state of rest implies then two motions. Where there is motion there is a disturbance. Motion tends to rest, the asperities on either side will soon wear off. This zigzag will imply a direct motion. A ship moving to the left and then to the right will imply an advance on its way. So it is in the delivery of a child, traction to one side and then to the other will surely produce an advance, and a most determinate advance. By so doing we move but a small portion of the child's head in advance, and after everything has acquiesced, then we move the other side of the head in a similar way, the two motions combined produce a direct advance of the head of the child, although the motions were in opposite directions, appar-

ently non-productive of benefit. But the case is otherwise.

The principle of alternacy, from side to side motion, not direct or open but hidden and obscure, not evident to the uninitiated. How can I apply this to the development of my plan? By promises and threats. By promising to those that will mind, and by threatening them that will not mind. But the real object to be obtained ought if possible be kept out of sight. A skillful general must keep his own secrets. But these threats and promises must be repeated, a single oscillation would only count a minute and soon be forgotten in the ocean of time. —

Persistancy.

We must persist, one stroke will fell no oak, but a single drop a minute will wear a deep hole into a rock; though each one will make but little impression. The falling of one drop leaves the possibility of the falling of another drop, so it is, the impression made must have been made gently so that not a revolution resulted.

Persistancy implies also Time, Gentility and Alternacy. That what has life has more persistancy than that what is dead; an Agent is heeded far more than a letter from Es k u c h e, it appeals more to the senses, therefore letters appealing to the different sentiments may do, but a living being cannot so easily be put off, to the living we have to answer, to the letter we can keep silent. A variety of means should be employed in appealing to the senses of the people.

Usury.

Here we must put on interest the capital we have made, a friend gained to the cause must be made the centre of action in one's behalf. The Chicago Insurance Agent recurs to my memory, who was trying to establish a No., say 10, of little centres of action allowing to every centre a percentage of, say three dollars, for every

member enticed; thus his idea was to get influential help, and if he failed to get the influential help, he at least attained the heads. For his help however he did not offer to pay any money but store pay, that is he offered a deduction on the insurance and this may have been sufficiently high to cover a light deduction; though he failed in this Town he succeeded in others, and the principle may be good.

If I would consequently employ some good talkers enjoined to secrecy to act-as Agents? would it pay to have say ten such men in every Town? This would be borrowing money to put out on interest, while the first is putting money on interest that is your own. In the first you hire your friends and pay them, in the latter you gained them first by paying them or working for them and now they pay you back.

The employment of friends, agents, clerks and servants becomes a necessity, money put away without interest will never result in riches, so a man depending solely on his own efforts will never become rich because he has no money on interest.

The force of number is very great, many people that would refuse the demands of one person readily yield when there are several together. This principle is well understood even among the savages.

I want a good personelle, an effective force to carry out my projects, if not by persuasion, by force, persons want to be compelled, without compulsion nothing can be effected.

Compulsion may be divided into:

Compulsion by money or fine.

" " loss of health.

" " being regarded as inferior.

Persuasion and Compulsion alternately employed will conduce to success. This

principle seems to be deeply rooted in human nature. The Expectation of heaven, the dread of hell. Show and preparation for carrying out the threats must be complete and ample.

Solidare Haft.

I might have every person in the Bund responsible for 10 dollars in case of loss from "bad pay" so that in reality a share for belonging to the Bund would be 20 dollars of which 10 only would have to be paid right down.

Notes:

I might take a note for five dollars or more and have him pay the interest on it, but in case that sickness should demand much medicine then the whole of the Note could be collected, or so much as should be necessary according to Rock's plan.

Insurance.

Could not things be arranged with my customers that they would subscribe for a certain share of 50 or 100 dollars, paying five dollars and then be entitled to a profit on the investment. If a man could have ten per cent on his investment he would have no reluctance.

Medical Relief Society.

I might call into existence a society where every member would have to pay a certain contribution per month, and out of this fund have the doctor paid.

Enmities

are caused by acting adverse to the well being of others, the sense of right or wrong is not taken into account by the adverse party. My blows on the Credit System offended a good many although they have been owing me for years, this sets them at variance with me. On the other hand persons are put at variance by being called on for money, especially in advance, and money when they are not in need.

People pay readily when they are in a pinch, when

they are in danger of losing a child or a wife; they hate to pay when the danger is past, when the bread is eaten, or when they are well, and not counting on getting sick; and not thinking of being in need of calling in a physician. To pay money in advance for what they think they might not be in need of, seems hard to them. Therefore it is best to get persons for the Bund when they are sick.

To get persons into the Bund, it would be well to try it at the bed side when suffering is fresh in their minds; or such as have been deceived by quacks so that their suffering is still apparent.

Persons joining the Bund belong to one of the following classes.

1. Those that are sick, and not expecting to get well quick: —

Hartley and Schuhmacher.

2. Those that are a little sick but think that in the end they might use more medicine than the amount of ten dollars.

Dondelinger.

3. Such as think that my services are indispensable some time and that the then higher charge would make up for what they have to pay now for the Bund.

Bartol and Hemmes.

4. A small class who really want to know where to go in case of sickness, also such as love a quiet mind.

Nelson, Jacobson and Anderson.

5. Those that have had a sore experience with disease and quacks in former times: —

Gantner.

Persons that will not go into the Bund may belong to one of the following classes: —

1. Such as are not sick much or such as have been squeezing along by using a few dollars worth of Patent Medicines, and think ten dollars rather an unjust extor-

tion: — Turner.

2. Such as are indebted, and on being called on to pay up feel a sense of rebellion, and thus feeling themselves assailed they grasp at everything as a weapon for fight: — Such as say my letters are compulsion. Smith.

3. Such as are dishonest. They don't want to come out with the money, therefore they resort to fight. Dreis.

4. Such as are out of the pinch at present: —

Bisch and Büchler.

5. Such as think it a humiliation. Meyer and Dix. Health and pride may keep them out.

Sickness and humiliation may make them go in.

Every person, whether he goes into the Bund or not, is acting selfish, he consults his own interest, not mine. Some look at the gross and immediate interest, others look not at the present, but at a more distant interest.

Therefore self-interest is the ruling passion of the people of this world. There is no other principle.

May the 1st. 1876.

The Gesundheits-bund counted about 100 members, some of which were "dead heads," a few had very little for their money, while others had about three times its value in medicine. On the whole it did not prove satisfactory to the people, nor to myself and was on this account discontinued. Two or three persons wished to be admitted to the Bund a second time, but these were such as had no hopes of ever bettering their condition. Thus we see a scheme inaugurated for the benefit of the people, and involving the best principles of human nature, come to a discontinuance.

The reason of this unfortunate issue was: 1. The ignorance of the people, in not being able to read, and most of them that were able to read could not understand. 2 The jealousy of my enemies, scattered lies

and nonsense broadcast, and these were accepted by the people in preference to the contrary which they could see in print. The people seem to be more ready to accept ready opinions, than to construe them themselves, from a written document with a little trouble. If I had expounded the meaning of the Bund to some great talkers and painted the same in vivid colors etc. — what I could not be made to do, since I thought it dishonorable, then the Bund would have enjoyed a more illustrious future. Another reason was, that mean people who were not consulted, thought the thing too good to be true, while others thought that they might get along without it. The Bund was an experimental success to show me the character of the people I am living amongst, but in a financial way it must be considered a failure.

The Bund may be classed as an experimental speculation and is good in its way, since it feels its way in the world and prepares for other speculations to be brought to success. — It is to be classed with the sewing machine speculation, the mine speculation, and the sugar-making speculation. Going further back we have the gravitation clock for detecting lead ores, the electric machine as a moving power, the life boat patents, and the button-hole invention, being of the same nature. All of them were of a speculative turn, and cost a nice tuition fee, which was sometimes a nice little sum, but always so well guarded as not to become ruinous. Whether the money paid out thus in acquiring money will ever prove remunerative, time will tell. All knowledge to carry out a speculation successfully, can only be obtained by the experimental method. Many experiments are necessary for establishing a new principle, so in this case. He is a wise man that determines great speculations with costless experiments, so that ruin will not overtake him, as in the case of J. D——.

The Centennial Exhibition at Philadelphia 1876.

By Dr. J. T. Scholl. May 1st, 1876.

The idea of the exhibition is due to the Franklin Institute. A Board of Commissioners was constituted by the Governor of every State nominating one individual, to be appointed by the President of the United States. The Centennial Board of Finance was next chartered to proceed in raising 10 Millions of dollars upon the sale of stock. A mass meeting, held on Washington's birthday (Feb. 22, 1873) induced the subscription of three Millions. In April, 1873, the Board of Finance was completed by electing 25 Directors from the stockholders. To induce foreigners to participate, it became necessary for the President to give his invitation in the name of the United States. The location is west of Philadelphia at a place called Fairmount Park, commencing at the junction of 41 street with elm avenue. The whole is embraced in a northern semicircle of 200 feet radius, between machinery hall and the main exhibition building being the centre, where the Pennsylvania Railroad will enter. Elm Avenue forming the base line and running parallel to the Machinery hall and Main building in a northwesterly direction.

From the central point, 1000 feet to the east of north east will strike the Memorial hall or Art gallery, 1000 feet to the north north west, will strike the crossing of Fountain and Belmont avenue. A semicircle of 1300 feet will strike to the north to Horticultural hall, to the north north west, on the right side the Womans pavillion, on the left side the United States Government building. The length of the Main building measured to the north west will bring us at the left to the State buildings of Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, North Carolina, Connecticut, Massachusetts and

Deleware, in a southwesterly row. To the right of this point in a north east direction is the Kansas State building, and 500 feet east will strike the corner of Agricultural hall. Half a mile will cross the Schuylkill at the east, approach the Belmont waterworks, strike the north west corner of Agricultural hall; at the south north west the 24th Reservoir and west St. George's hill. 3000 feet will touch Mantica Station at the south east and the Columbia bridge at north north east.

Buildings. The Main exhibition building is as many feet in length as we write years after Christ, 1876, and its width is about one-fourth of this, 464 feet, covering 21 acres. In a line with this in a west direction, 440 feet off, commences the Machinery hall covering 14 acres, 1402 feet long and 360 feet wide, being the number of degrees contained in a circle; it carries an addition abutting with Elm Avenue forming the base line. At the farthest end of the Machinery hall stands the fountain giving its name to Fountain Avenue running north east; and at 2000 feet distance having Horticultural hall on the left. — The Main building is set apart for metallurgy, manufactures, mines, science & education. The Machinery hall is separated diagonally from the Main building by Belmont Avenue. On the north it is 274 feet from Elm Avenue, but the southern addition abutts nearly with it. The main section of the hall has but one story being 40 feet from the floor to the main cornice, while the clear height of the main passages is 70 feet, and that of the side passages 40 feet. Two main avenues run through the hall and one through the south addition, being 90 feet wide; these have crossings through the middle and up to the sides. The foot passages of the main avenues are 15 feet, of the addition avenue 25 feet and all the other passages ten feet. The addition is 210 feet square and covers a reservoir 60 feet wide and 160 feet long by 10 deep. Hydraulic motors are

here to be exhibited in operation. South of the reservoir will be a waterfall 35 feet high and 40 wide, supplied by pumps.

The Art Gallery or Memorial Hall was erected by the State of Pennsylvania at a cost of one and one-half million of dollars for a permanent structure, covering one and one-half acres. It stands to the north of the main building upon a terrace 122 feet above the level of the Schuylkill. It is 365 feet long, 210 wide, and 50 feet high over a spacious basement 12 feet high. The centre carries a dome 150 feet high, capped with a colossal ball bearing the figure of Columbia. The main entrance to the south has three arched doorways, 15 by 40 feet high is 70 feet wide and is approached by thirteen steps. The pavillions, four in number make up the corners, they are destined for the display of statuary. They are connected with the central part with arcades of five arches; leading to garden plots 90 by 36. The entrance hall is 82 by 60 feet leading into the central hall 80 feet cube. This hall leads into the galleries at each side 98 feet long, 43 wide and 35 feet high. From this building an extension of 280 by 180 feet has been carried northward covering an acre of ground.

Horticultural Hall. It is 383 feet long, 193 wide and 72 feet high, and is intended for a permanent structure. One of the galleries will be heated and contain orange trees bearing fruit, the India rubber tree, cactuses etc. The central conservatory, 230 feet long by 80 wide and 55 high, is surmounted by a lantern 170 feet long. At the end at each corner is a hot house 100 by 30 feet, with vestibules of 30 feet between.

The Bureau of Agriculture has received a proposition for the construction of 25 Aquaria tanks from 2 to 20 feet in length and 6 feet in depth for the exhibition of fish, including sharks and porpoises. All what pertains to fish and fish culture

will be exhibited by professor Henry and Baird. The Massachusetts Commissioners have called for live fish to be exhibited in the Aquaria as follows: Cod, Haddock, Lobster, Shark, Sword fish, Seals, Sunfish etc. The Japanese will have a garden about their building planted with flowers from home. The Centennial Post Office 2100 square feet or about 45 by 45, will be in the Government building, and the General Post Office Department will occupy about 40 feet square, and display an envelope machine, stamps, maps, etc. The United States Government will establish on Belmont Avenue near State Avenue a Signal Office. There will be a building erected for the exhibition of medals from Paris and Jerusalem. Landsdown Valley will be spanned by a bridge 50 feet long and 68 feet above the ground. A narrow gauge railway having two tracks will run to all the principle buildings. Price 5 cents. The Woman's Department will display the Kindergarten. Mr. John Hatch of California will exhibit 12,000 specimens of ores. Flood and O'Brien will ship 150 tons of gold and silver bullion. The Pacific Railroad will exhibit marbles, granites, slates, fossils and ores of the Pacific coast. An International Medical Congress will be held Sept. 4th for 5 days. Maine will show granite, feldspar, etc. One and one-half Millions of dollars have been appropriated by the United States. Education is to be exhibited in the main building but it has been concluded to erect at a cost of \$ 1,500 a Kindergarten school 20 by 26 feet, a Common school 20 by 30 feet, and a City school 30 by 40. Connecticut is taking the lead.

Egypt's contribution is by the Khedive drawn from the vice-regal museums. One hundred thousand dollars were devoted to the enterprise. Will be exhibited in the main building. The ancient papyrus and hippopotamus hide will be side by side. Brugsch Bey a learned Egyptologist and a student of Gottigen, will have

charge over the Egyptian Antiquities. The international Congresses of every field of learning is to stamp the Exhibition with the mental status of the period. The Ohio State building displays stones from 24 different quarries in its construction. It is 40 feet square. The four trunk lines have discarded middle men. Spear's travelling side walk, one mile in length will be on the grounds. Prof. Hayden, Chief of the United States Geographical and Geological Surveys of the Territories, is preparing an exhibit of the Geography, Typography, Geology, Mineralogy, Botany, and Ethnography of Colorado, New Mexico, Arizona, Wyoming, Utah and Montana. Photographs of scenery. Plaster casts of the Rocky mountain ranges and the villages of the cliff dwellers.

Centennial Boarding-house Agency. Coupon tickets will be placed on sale in various parts of the country to be received by Boarding-houses as pay for board rendered. The purchaser will be met by a messenger when the cars approach the city, handing a card of direction and introduction to the quarters assigned to him. Clean lodgings and two meals a day will be furnished for two to two and one-half dollars per day. The Continental hotel has erected a branch hotel opposite the west end of the main building. The Girard house has been enlarged. The St. Stephens, Collonade, La Pierre, Bingham and the St. Cloud, all have increased their facilities for accommodation. Smaller hotels are the American, Merchant and St. Elmo. Of the new hotels the Globe stands prominent, it is nearly opposite the main entrance of the E. B. This has a frontage of 520 feet by a depth of 540 feet, it is four stories high and contains one thousand rooms. Three thousands guests may be accommodated and two thousand persons can dine at once. The United States hotel is a square south of the M. E. B., and is of a higher grade. It is composed of two rows of two story brick buildings joined by a shorter row of 4 story buildings. The Grand Union in the northern part of the city is about the largest of the dwelling house hotels. It consists of 90 separate houses in 3 rows, 60 of them three stories in height. Trains will run to the grounds in ten minutes. The next hotel of the kind is the Aubrey in Walnut street, West Philadelphia; it will be able to accomodate 4 hundred guests. The Centennial Home at the west of the grounds will be

less expensive. It will consist of one hundred and forty small houses, with a common kitchen and dining room, is within 10 minutes walk, and will be largely patronized by the exhibitors. The International Restaurant at Chestnut street, promises to feed ten thousand people a day and to furnish lodgings in private houses to twenty five thousand persons. The Centennial Boarding-house Agency have canvassed the city. Hon. A. J. Dufur Commissioner for Oregon will exhibit the woods of the Pacific coast. Judge Murdock of Iowa is collecting the fac similes for representing the Mound Builders of the Mississippi Valley. The giant tree of California, is in hollowed sections 16 feet long and 20 in diameter, of 2000 rings, height 276 feet. Captain A. S. Whittley of St. Louis is making collections of antiquities of the Mississippi valley.

The Woman's Pavillion. It is located on Belmont Avenue near the Horticultural hall, it is constructed of two naves intersecting one another, and is 192 feet long and 64 wide. The corners are filled out by four pavillions 48 feet square. The centre of the building is raised 25 feet higher, carries an observatory and cupola making the whole 90 feet high. Goods manufactured by women only will be secured. A section will represent engraving, lithography, bookbinding and patents. The American Book Publishers Association has authorized a committee to spend 2000 dollars. In the M. E. B. a two story structure is to be filled with book cases.

Brazil will exhibit coffee, Brazilian tea or mati, Jaborandi, cotton, etc. The Centennial Mail service is left to Thomas Gannon of Philadelphia, and is to employ 5 wagons and ten horses.

C. H. Goodrich will exhibit a portrait of Washington in silk, woven on the Jaquard loom costing ten thousand dollars. Spain will occupy in the west wing of the main building eleven thousand square feet, in the Agricultural hall it will exhibit its coffee, sugar, spices, figs and olives. In the Art gallery it will occupy one-half of the west wing of the gallery. The Pennsylvania Railway depot will stand just outside the grounds, the general waiting room will be 130 by 100 feet, ticket office 40 by 30 feet. West Virginia will exhibit sections of coal seams eight to ten feet thick and of timber three to ten feet in diameter. The Emancipation mon-

ument is to be unveiled on the 4th of July. A huge pair of Corliss engines have been put up in the Machinery hall, they have cylinders forty inches in diameter, ten feet stroke and are of 1400 h. p., they will be supplied with steam from twenty tubular boilers, 49 inches in diameter by 14 feet long. George P. Rowel put up a Newspaper building to be supplied with cases having 150 pigeon holes to contain the 8000 papers of the U. S. 66 by 44 feet. Prof. Ward of Rochester New York wants to exhibit skeletons of former ages. Naples will exhibit articles of coral. The Indiana State building 55 ft. in diameter in the shape of an irregular cross, it cost ten thousand dollars. Great Britain will exhibit optical instruments, printing presses etc. The Pennsylvania State building, located near Belmont Avenue, cost fifteen thousand dollars, and is 98 by 55 feet. The Photographic hall is 250 feet long east and west and 108 feet wide north and south. M. Adolph Braun has applied for two hundred and sixty five feet of space to hang his carbon prints. Fountain avenue runs due east and west. The Brazilians have made application for two thousand feet inside the palm house. In Memorial hall the north western pavillion is set apart for England, the north eastern for France, the south eastern for Germany, and the south western for the United States. It will be lighted by two thousand gas jets to imitate diffuse sunlight.

Centennial concessions. The Globe hotel pays \$10,500; the French Restaurant, P. Sudreau \$6,000; American Restaurant, Tobias & Heilbronn \$6,000; German Restaurant, Lauber, \$6000; Hebrew Restaurant Chas. Tollman, \$600; Cafe in Main building, Frank Greene, \$5,000; Trois freres Provenceaux, Paris L. Gougarl, \$5,000.

The Franklin Institute Phil., issues a supplement of the Journal of the Franklin Institute. The city of Mexico will be represented by a model 330 by 291 feet peopled with sixty thousand leaden figures. The M. E. has four cafe's and the Machinery hall, five. The New Jersey State building is located opposite the M. B. on Belmont Avenue, it is 84 by 42 feet, cost \$8,000, and has an observatory. The Newspaper building is situated between Machinery hall and the Government building. A catalogue will be issued similar to the catalogues

of the four other departments. Outdoor art. The statue of Columbus stands at the intersection of Fountain and Belmont Avenue, it is nine feet high. Next is the statue of William Penn of bronze costing twenty five thousand dollars. The Humboldt statue, (\$ 13,000.) the soldier 18 feet high, the Centennial, (\$ 5,000.) and the statuary emblem of religious liberty (\$ 30,000.) are all worthy of notice. The American soldier will be a statue 21 feet high weighing 30 tons, constructed of granite and will be erected on the west terrace of Memorial hall, while the east terrace will receive the marble statue of Washington hewn from a single block. Frank Etting will have the care of the historical department. The committee of the Franklin Institute will illustrate steam engineering. Mexico will send a lump of silver 5 feet 9 inches high, worth \$ 72,000, from the Potosi silver mine. The Belmont reservoir has a capacity of 40,000,000 gallons of water. The boiler house contains 20 boilers among which boilers of every description may be found, it is located south of Machinery hall. The pumping engine house stands on the south bank of the Schuylkill near Belmont Landing. A Worthington Duplex pumping engine, capable of pumping 6 million gallons a day does the work. The standing pipe 28 feet above the level of the river, 125 feet above the floor of the Main building, is placed north of Memorial hall at the park drive, it is four feet in diameter and is 120 feet from its base, it is terminated by a finial of 13 feet in length. An 18 inch main leads to it. A 16 inch main leads from the standing pipe to the Belmont Avenue, and from here 12 inch mains, three in number underlie Machinery hall and the Main building, and a ten inch main supplies the lake through three concentric rings north of Machinery hall.

The American Restaurant erected by Tobiasson and Heilbronn, faces by its central portion Horticultural hall. The main banqueting hall on the right is fifty by one hundred feet, the dining hall occupying part of the central building is thirty by fifty and the portico connecting them sixteen by one hundred. — Express trains will run from New York to Philadelphia in one hour & one-half. Return tickets to and from Philadelphia will be, from Milwaukee \$ 36.50; from Chicago \$ 32; from Kansas city, Leavenworth and Omaha \$ 56.

The practical metalworker's
Assistant and Electrometallurgy.

By Oliver Byrne.

New and improved Edition.

Henry Carey Baird, Philadelphia,
406 Walnut street.
1864. Price \$ 7,00,

Metals and alloys.

180. Antimony expands on cooling, melts at about 800 degrees. — Bismuth melts at about 500. 8 parts of bismuth, 5 of lead and three of tin constitute a fusible alloy. One of bismuth and two of tin form an alloy suitable for rose engine and eccentric turned patterns. 8 parts bismuth, 5 lead, 4 tin, and 1 typemetal are used for making french medals by the cliché process. 182. Copper when alloyed with one-tenth of its weight of arsenic is in appearance similar to silver. Two parts of copper and one part of zinc make brass. Equal parts of brass and zinc form spelter solder for brass. Copper alloyed with one ounce of tin to the pound of copper forms soft gun metal, two ounces of tin to the pound of copper is used for bearing for machinery, two and one-half ounces of tin form the most tenacious alloy, and 8 parts form the speculum metal. For wheels to be cut into teeth, one and one-half ounces of tin, 2 of brass, and 16 oz. of copper are used. For turning work, two tin, one and one-half brass, 16 copper.

Typemetal; Lead 3, Antimony 1, for the softest type, lead 7, and antimony one. Added usually 4 to 8 per cent of tin and sometimes one or two per cent of copper.

Stereotype plates contain 20 lead, 5 antimony and one of tin. Expansion metal. — Nine parts lead, two antimony and one of bismuth. **Electrometallurgy.**

Plumbago as a coating was discovered by R. Murray. The metals deposited will be in the form of coarse powder if the current is too strong, if no hydrogen is evolved at the negative plate then the metals will be deposited in the crystalline form, and in the reguline form if the current is weak in relation to the strength of the solution. (Laws of Since.) Electrode means pole, anode, upwards, copper or positive pole; cathode downwards, zinc or negative pole. Prof. Daniell calls them platinode and zincode. An electrolyte is a metal in solution undergoing decomposition. The positive electrode is the metal being dissolved in the electrolyte, the negative electrode is the metal or mould receiving a deposition of metal from the electrolyte. Cast plates of zinc should not be used. — Zinc is the positive, and copper the negative metal. Lead becomes covered with an oxide, having none of the properties of the metal, it therefore is inapplicable to battery purposes.

The conductivity of the metals are: Lead 1, Tin, Iron and Platinum 2, Zinc 4, Gold, Copper and Silver 12. Platinum on account of its low conducting power makes but a weak battery with zinc. Metals that are bad conductors must be placed very close to the other metal. Tin and zinc make a good battery. The oxide formed by the acid on the zinc plate is dissolved, and the clean plate presented afresh to the acid, the sulphate of zinc dissolves in the water, and when this takes place no longer then the battery will cease working: the zinc salt being heavier falls to the bottom of the cell, forming a denser stratum; and by its minor power of absorption it divides the zinc plate into two halves, the lower of which is negative, thus establishing a private current. The cell should therefore be made deep so that the zinc salt may fall below the plates. The Bunsen battery has a coke cylinder, made by coking powdered coal, soaking this in a solution of sugar and coking again to make it

very compact. One part of sulphuric acid to twenty four of water form the best solution for acting on zinc. Moulds should be taken in wax, they are better than those of plaster. Gutta percha is good. Putting the moulds in the bath may require shaking to remove the air bubbles. Hollow parts require connections by the finest wires and the zinc plate comparatively large. Where the mould does not admit of black-leading for giving it a conducting surface it should be suspended from its electric connections for 3 minutes in the following bath: Phosphorus 1, bisulphide of carbon 15, (or moulds made of, one lb. of wax, one lb. of deer tallow, mixed with one-tenth of a pound of a solution of phosphorus 1 part to 15 of bisulphide of carbon); and when taken out of this it is placed for 3 minutes into a bath of nitrate of silver, one ounce of dissolved silver to three gallons of water, or in a solution of one ounce of gold in ten gallons of water. When placed in both baths so much the better. Place the mould below and the positive electrode above, so that as the latter dissolves its salt will fall upon the mould. Articles should be kept in motion. Glypography is a species of engraving discovered by Palmer.

To cover iron with copper, prepare first a solution of cyanide of copper as follows: Precipitate a solution of sulphate of copper by a solution of ferrocyanide of potassium, the precipitate is washed and dissolved in a solution of cyanide of potassium. The ferrocyanide of potassium will crystallize out of the solution when concentrated, but is no objection. The solution must be worked at a temperature of 150 to 200 degrees of heat. After a coating has formed the plating may be continued in a bath of sulphate of copper. Iron may also be covered with zinc.

Electroplating. The dissolution of silver in four parts of acid and one of water is precipitated with

cyanide of silver, this is to be washed repeatedly by decantation and then dissolved in a solution of cyanide of potassium. One ounce of silver to the gallon solution is a good proportion. In making solid articles of silver, 8 ounces to the gallon is best. The silver cyanide may also be dissolved in a solution of ferrocyanide of potassium, is excellent for plating but the solution becomes soon exhausted. The best and cheapest way of making the silver solution is by the electric battery. — A good plating solution is made by dissolving chloride of silver in a solution of hyposulphite of soda, it must be worked in the dark. 600. Opposite currents are formed when the solution gets to be of different densities. The plating solution must have free cyanide of potassium, say $\frac{1}{2}$ an oz. to the gallon solution with one ounce of silver; if the cyanide of potassium is in excess then the silver solution will become gradually too strong and require testing. Sulphuret of carbon added to the depositing cell gives a bright appearance to the silver. Solid silver articles are made over a copper shell deposited on wax etc. and this copper is dissolved by weak muriatic acid, or better, by a solution of perchloride of iron.

Electroplating. Digest the chloride of gold with calcined magnesia and boil the resulting oxide in nitric acid to dissolve the magnesia and when washed dissolve in a solution of cyanide of potassium, it must be worked at a temperature of 130 degrees and contain free cyanide of potassium. Preparing the solution by the battery is the best way. The fumes of the cyanide bath will produce debility, bleeding from the nose, rushing of blood up the back of the head, giddiness, and apprehension, accompanied with a hissing noise, pain and blindness for a few minutes, the dimness would often last some months.

Theory of electric deposition. The electricity or rather the electrical vibrations of the positive metal in passing from the metal through the solution making the

copper atom part of the conductor, setting the sulphuric acid molecule free to dissolve the positive element, passing from molecular to molecule of the sulphate of copper, so that on the side of the negative element one atom of copper is left over without any acid to combine with; it is therefore deposited upon the negative element. (The atoms of copper are freed by the passage of the current, and probably moved slightly forward by the current wave the same as a water wave or a wave of air or ground the motion is communicated from one atom to the other, and at the end there is a slight motion of substance forward which is deposited, while the acid receives no such forward impulse and is left to act upon parts adjoining. All waves have a forward propulsion of matter, light, sound, water waves, earthquakes, electricity; but it is only the terminal atom what is translated the distance of one wave. The parts between impart motion one to the other. The sulphuric acid passes to the copper rather than to the other side because it has more affinity for the copper, and would do so if the copper was not under the influence of electrical vibration, and probably to the same amount, the acid may therefore be entirely independent of the current in its action. On the side where the deposition goes on there is hence a layer of atoms of copper because pushed forward by the vibration, and on the copper side always a layer of acid, because the copper atom has been pushed along).

Muscular force is according to Dr. Falkland not a product of the muscular nitrogenous tissue itself as was formerly held, but the product of the oxydation of carbohydrates. The muscle playing the same part as a steam boiler does in the production of work, with this difference that the muscular tissue renews its wear and tear.

Manufacture of Sugar.

1868. Patent Office Report. (Mechanical.)

82,106. Removing odor of Beet root by cane syrup heated to 150 Fahrenheit. 75,656. Pressing the sugar as it comes from the centrifugals and next heating it to dry it. 75,687. 77,017. Centrifugal for draining sugar. 78,695. Sugar evaporator. The fire is directed to one side of the pan. 76,495. Filtering bag. 79,558. Filtering apparatus. 79,819. Magnetic sieve to attract iron particles for filtering syrup. 80,819. The granulator is a transparent box for solar light to act. 83,974. The cane juice is treated to sulphurous acid, then boiled, next carbonate of lime added and manganic acid. After boiling, milk of lime is again added. The pan has double covers. 80,340. Apparatus for bringing the juice in contact with gas, for purifying by centrifugal force. 79,464. Under the pan is a partition, so that the heat has to pass forward and back. The fire can also be turned into the flues.

Patent Office Report, (Mechanical.) for 1867.

63,797. Apparatus for mixing sugar. 61,224. Combining the vacuum and condensing chamber. 61,898. The sugar is filtered at 212 through boneblack. 62,146. Room for granulating sugar. 62,295. Plates of cast iron are inserted between the fire and evaporating pan. 62,440. The juice is passed through boxes with filters. 63,300. Sugar sieve. 63,770. The Centrifugal has lateral motion. Holes below for discharging, closed by valve. 64,029. Rolling dough and crushing sugar. 64,139. Starch sugar convert at 300 degrees of heat. 64,181. Air and water spray are applied to the inside of centrifugal, to wash sugar. 64,875. Sugar cane stripped. 65,352. The sugar loaf has a hole in the middle. 65,546. Rotating strainer for syrup. 65,658. The sugar in the centrifugal is moistened with

water for purification. 65,848. The syrup runs from trough to trough for the purpose of granulation. 65,923. A spiral plate scrapes the sugar from the revolving wire cylinder, and distributes it in the pan. 66,089. A pipe between vacuum pan and condenser. 66,370. The condensed liquid runs into a pipe thirty six feet long, so that it may be withdrawn without impairing the vacuum. 66,369. For cooling the crystallizing tank. 66,241. For draining sugar. 67,662. Water is passed through sugar by centrifugal. 67,924. Liquoring tank. 68,328. Refining sugar. To one hundred gallons of cane juice, neutralized by lime, add: Tannic acid one-fourth of an ounce, Slippery elm one-half pound, Sulphite of lime four ounces, and Alumina four ounces. Boil, skim and filter. 68,356. Centrifugal. 69,249. The syrup is stirred as in a Wetzel and cooled. 69,328. G. E. Evan's, Boston, Centrifugal. (see). 69,684. Pan with double bottom, one or more kettles communicating with each other. 71,876. 71,877. The sugar is driven by a pan against a screen to drain it. The screen is kept clear by a scraper.

Patent Office Reports for 1866.

52,424. The cane is boiled to coagulate albumen. 52,956. Moulding sugar. 54,456. Centrifugal like frustrum of a cone. 54,597. Stirring and dissolving sugar. 54,446. Cloths attached to frames are saturated with juice and then exposed to air. 58,824. Maple flavor for sugar. 57,465. Heating the cane before crushing. 58,098. Centrifugal. 56,663. Sugar from corn. 59,183. The Sorghum juice is neutralized by lime and alum, skimmed etc., the alkali neutralized by acetic acid. 59,598. Centrifugal. (see). 59,956. Centrifugal. (see).

1865. P. O. R. Mech.

46,419. To use a vacuum pan with small vertical tubes, at the boiling point of water, a steam of one lb.

pressure to prevent carbonization. 46835. Rushing sugar cane. 47,147. Circular saws for cutting sugar into blocks. 47,420. Moistening raw sugar with alcohol and pressing it between cloths. 47,583. The pan has wheels to run on a railway. 48,580. The juice is treated to oak bark, then boiled and skimmed, (afterwards to lye? 49,012. Sugar from corn. The syrup is boiled with alumina. 49,310. Conveying syrup into centrifugal. 49,577. Stripping cane. 49,750. Sugar from corn. The corn is treated to lye. The syrup boiled with animal charcoal. 50,081. Collecting spirit while refining. 51,502. Cooling the syrup to deprive it of gum.

1864. P. O. R. Mech.

41,106. Series of pans where the scum collects behind abutments of colder portions. 41,253. The caloric passes through a series of furnaces, with dampers. 41,855. Saws for cutting sugar into cubes. 41,941. Skimming machine. 42,109. Crushing mill and pan for farmers use. 42,728. Sugar from corn and beets. 43,118. Stripping sugar cane. 43,220. Oscillating skimmers. 43,566. Steeping the cane in limewater. 43,701. Device for removing pan quickly. 43,743. Skimmer operated by cams. 44,211. Sugar mould carriage. 45,561. Crystallizing starch and cane syrup together. 45,579. Moulding sugar.

1863. P. O. R. Mech.

37,548. Forcing small jets of syrup through sugar (under pressure) for purification. 37,824. Alcoholic vapor is drawn through sugar by suction. 38,114. Stripping cane. 38,487. Cube sugar. 38,710. The juice is raised to a boil in one pan, and then evaporated in another. 38,787. Compacting sugar in barrels. 38,854. Making cube sugar. 38,958. The pan has a skimmer. 40,043. Crushing and blocking sugar. 40,454. Sugar mould carriage. 41,008. Sugar boiling

over detector.

1862. P. O. R. Mech.

34,686. Carriage for sugar moulds. 34,811. The steam generated in the pans is used for expelling the contents. 35,160. Revivifying animal charcoal: 1st. Steam will decompose ammonia compounds. 2nd. Acids or mono-phosphate of lime to abstract lime. 3rd. Carbonate soda and steam. 35,679. A secondary fire door. 36,067. Using phosphate of ammonia in conjunction with sulphurous acid or a sulphite. 36,988. Using Ammonia instead of milk of lime. 37,046. Dripping pots with ribs.

1861. P. O. R. Mech.

31,662. The boiling juice throws the scum into a supplementary pan returning the juice. 32,282. For breaking sugar. 32,873. Drip pots. 33,078. Cube sugar. 33,111. Four sawing cylinders for cutting sugar squares. 33,226. Vessel for dissolving sugar. 33,524. Heating sugar by steam, then pressing into cubes. 33,593. The furnace is moved from under one pan under another one. 33,674. Alcohol is forced upwards through sugar. 33,987. Alcohol for washing sugar.

1860. P. O. R. Mech.

27,257. Skimmer with float. 27,613. Crushing knives. 27,726. Sugar holder. 27,783. The boiler has partitions and tubes. 28,171. Two pans are hinged. 28,183. Cutting loaf sugar. 28,198. Drying sugar. 28,769. Defecation with diluted alcohol. 28,903. Cutting sugar. 29,076. Sugar kettle trains. 29,115. Draining sugar. 30,108. Refining raw sugar by sulph. ether and alcohol. 30,145. Cutting machine. 30,927. Stripping cane. 30,951. Tanks for crystallizing.

1859. P. O. R. Mech.

22,578. Using alcohol. 22,732. Floating cover.

23,270. Pans pivoted in the centre. 24,149. Cutting sugar cane. 24,204. Cutting sugar cane, by machinery. 24,572. Defecating with sulphur and lime. 24,592. Defecating with sulphate of tin. 26,007. Melting raw sugar. 26,050. Diluted alcohol for sugar and juice. 26,574. Semicircular boiler connected with a vertical steam boiler. 24,910. Saws for slabbing sugar and cubing.

1858. P. O. R. Mech.

20,288. Mill for cane. 21,340. Mill for cane. 22,126. Flue encircles the pan. 22,307. 19,515. Setting sugar kettles. 21,786. Defecating with hydrate of alumina. 20,247. Acids and steam at 300 degrees for glucose. 19,743. Sugar mould carriage.

1857. P. O. R. Mech.

17,933. Sugar Pan. 18,215. Drip pot. 17,409. Tips for moulds. 17,021. For Honey, boil one-half ounce alum, eight pounds sugar, and 1 quart water. 16,051. Draining apparatus. 15,691. Five open pans, the fire has less surface to act upon as the pans get smaller. As the fire gets less more flues are used. (See.) 14,717. 15,421. Evaporator. (See drawing.)

1855. (page 487.)

12,719. Melt sugar in vacuo. 13,203. Draining sugar. An endless band takes the moist sugar and passes it over an exhausted air passage; where its molasses parts. 13,740. A series of filters for continuous operation. (see drawing.)

1854.

11,782. A series of pans on the naked fire. An endless belt of skimmers. Steam generators of the tubes on the sides of the pans. (see.) 11,801. Throwing a spray of juice or syrup on a heated surface by a centrifugal for speedy evaporation. (see.) 12,101. Sugar mould. 1853.

9,560. The sugar is placed into a bag before it goes

into the centrifugal. No need of wire cleaning. 9,607.
Hot air is forced through liq. 9,608. Filter. 9,618.
Heater for syrup.

1852.

8,156. Centrifugal. — 8,362. Draining. 8,450.
Sugar vacuum pan. 8,545. Centrifugal. 6,519.
Steam pipes. 6,671. Sugar pan.

P. O. R. Mechanical.

85,528. Feeding device for Centrifugal. 87487.
Draining sugar by action of steam. 88,185. Centrifugal. 89,279. Utilizing scum for prussiate and manure. 90,549. Drying sugar by air. 90,616. Using hydrate of magnesia or phosphate of magnesia, or both combined as neutralizing and clarifying agents. 90,762. Treating molasses to alcohol and sulphuric acid and filtering. Using sugar crystals on skeins and fabrics for coaxing crystallization amid the acid and alc. liquor. 92,403. Using superheated steam in the centrifugal. 92,932. Apparatus for boiling sugar. 94,475. Emptying sugar kettles. 95,496. Treating molasses to Methyl, sulphuric acid and afterwards to sugar crystals. Dried beet root may be treated the same. 95,798. Drying sugar by drawing heated air through the sugar loafs, while yet in the mould. 95,958. Evaporating pan. 96,186. Centrifugal. 96,752. Self-feeding Centrifugal.

Druggists Circular. vol. xi 1867, — 68 — 70. Extracting juice from beets by diffusion below 50 degree. 165. Sugar from molasses by precipitating sacharate of lime by alcohol. Vol. 7, 1868, page 124. Beet sugar. Maceration process of Roberts. — Process of Schutzenbach. 177. Sulphurous acid to bleach sugar, 4 lbs sulphur to 1000 pounds of sugar. 243. Best work. Der praktische Ruebenzucker Fabricant under Raffinadeur, by L. Walkhoff. 3rd Edition, 1867, by E. Steiger. 256. Molasses returned to the beet pulp after being diluted 60 per cent

of beets used and pressed, thus albumen and potash should remain. Vol. 8, 1869. 86. Sulphate of magnesia in clarifying. 87. Precipitating clarified juice by carb. Baryta. 121. Defecate by lime in successive trials, boil and filter. Neutralize lime by carbonic or phosphoric acid. 147. Fluo-silicic acid is used to precipitate potash in the juices and chalk for acids. 148. A new sugar compound precipitate, containing lime 40, sugar 43, carb. acid 17. 148. Alum shale instead of animal black. Vol. 14, 1870, page 59. Polarizing apparatus, price \$ 30 J. F. Luhme. 68. Potash obtained after fermentation. 76. Polaroscope, Wild's, Sentzke's, Voleil's, Mitcherlich's 83. Chemistry of sugar. Three parts of lime and one of sugar form a sacharate insoluble of hot water which may be washed by hot water, insoluble in alcohol, soluble in cold water. Albuminous substances removed by boiling are soluble in alcalies, and when boiled produce ammonia. Also soluble in sacharate of lime. Silicic, oxalic and phosphoric acids are precipitated by lime. One part sugar and one of lime form a soluble sacharate, insoluble in alcohol. 108. One Billion tons sugar used yearly. 112. Four Billion cwts. made in Germany. 189. To test sugar use glycerine instead of tartaric acid in Pheeling's test.

D. C. vol. 15, 1871. 136. Sulphurous acid of one to one and one-fourth per cent use from three to fifteen parts to one hundred parts of solution of sugar 28 to 42, Baume and boil. 122. Sugar from Melons, the juice contains no potash. 136. Glucose to make, add two ounces of nitric acid to every pound of sulph. acid. Vol. 16, 1872, page 72. Manufacture of Glucose. 73. Cane sugar in water will turn into Glucose in five mo's when subjected to light. 184. Charcoal keeps oxygen in concentration. 199. Historical. —

Scientific American, vol. 2, page 404.

Cane sugar,	25,000,000	cwts	} made yearly.
Beet	3,250,000	"	
Palm	2,000,000	"	
Maple	405,000	"	
Manna & honey	10,500	"	

Vol. 3. 160. Defecate by lime and carbonic acid.

Vol. 4. 58. Precipitate the lime by persulphite of calcium, pass juice through a mixture of bone black and subsulphate of iron. 2nd. Sulphides of potash and soda may also be used, these sulphides not hindering crystallization of the sugar. 34. Sugar from beets, carrots and turnips. 103. Maple sugar pan with wooden sides.

194. M. Rosseau's process. Mix three parts of plaster with one thousand of juice and boil. Eight per cent of hyd. peroxide of iron will remove matters turning black.

Vol. 5. 187. Sulphate of lime and peroxide iron. 123

Caloric engines failed in factory. Vol. 6. 243. Molasses from Sorghum. 103. Sugar in presence of alcali, will dissolve phosphate of lime. (Or teeth.) Vol. 7.

Nothing. Vol. 8. 18, Syrup of Sorghum left for weeks to crystallize. 52. Syrup, to make, add milk and eggs.

215. Maple sugar will not burn until all the water is out, it cannot boil too fast. 245. Northern sugar to be

refined in Chicago. 327. Maple sugar liable to three per cent, add valorem. 259. Sugar antidote to Stry-

chine. Vol. 9. Nothing. Vol. 10. 228. A Wetzel is a one-half cylinder ten feet long. A turbine or centrifugal.

241. Maple sugar. 247. Pan of cast iron three, by six and one-half feet, price \$ 20. Vol. 11. 403.

Starch sugar with illustration. Vol. 12. 18. 1st. Boiler 600, 2nd 400, 3rd and 4th 300 gal. 21. Making glucose. The starch is heated by steam to three hundred and twenty pounds pressure. (or 6 atmosphere.) Silicate of

potash is a test for dextrine. At three hundred & twenty, the essential oil from grain distils over. The converter is a boiler lined with lead. Vol. 13. 199. Su-

perphosphate of lime in the juice when boiling prevents the formation of glucose. 243. M. Payen uses congelation. Ice removed by press and centrifugal. Vol. 26. 68. Use mono-sulphate of calcium to remove iron etc., and precipitate by sulphide of magnesia. One-half lb of the former to $\frac{1}{2}$ lb of the latter. 69. Bichromate of lime instead of charcoal. 167. Beet sugar failed at Chatsworth Illinois. 264. Sugar beets: — Vilmorin, Imperial, Electoral and Vienna globe. Goesman mentions: — Garrott's famous seed drill. Ploughs with two knives for beets. Robert's diffulsion process. Freeport, Illinois, factory is three hundred by two hundred feet, two stories high, cost one hundred and fifty thousand dollars, and has eleven engines, from four to forty horse power.

Vol. 17. 51. The beet gives no sugar by simply evaporating the juice. One-half per cent lime added to juice after raising to 80 degrees answered. The asparagin is converted into asparagic acid combining with lime and ammonia. 53. Indifferent seed, produces sickly plants. 111. Illustrated helical evaporator. 130. Drying sugar by a revolving drum with slats letting the sugar fall upon a steam cylinder, also revolving three by twenty feet. 195. Cuba sugar factory (Ill.) cost one hundred and sixty thousand dollars. 212. Lime and carbonic acid.

Vol. 18. 54. Sugar filters, one by two metres, three in number. 114. Rapid evaporator, made of paddles, each paddle is made of a coiled tube carrying steam, the receptacle may be a wooden box.

Manufacturer and builder, volume 1, page 230. Beet root sugar manufacture.

Agricultural Reports, 1853, page 234. Sugar made. — M. S. 120,000,000 pounds in 1840. 1854. There were fourteen hundred sugar houses. 1857. 189. Analysis of eleven varieties of Sorgho and Imphee. Some gave only grape sugar, some cane sugar. The green canes

produced grape sugar, the ripe ones cane sugar. 192. Sugar bearing capacity of Sorghum. Analysis gave ten per cent cane sugar, and two per cent grape sugar. 196. Three-fourths of a ton of sugar per acre. 1854. 219. Sorghum. Vilmorin found that the sugar increased till the seeds were in a milky state. 338. Names of beets. 1855. 273. Varieties of sugar cane. 274. Eighteen per cent sugar in cane juice. 279. Sorghum grows where Indian corn will thrive. 1859. 1860. Nothing. 1861. Not on hand. 1862. 399. Sugar house to be higher on one side than on the other. Pan to be made of sheet iron or tin. 514. Sorghum, Imphee and Otaheiten are the only three species. 525. Fehling's solution precipitated the gum present as a flocculent precipitate unlike glucose. Percentage of uncrystallizable sugar seven per cent, cane sugar eight per cent, in the juice. 529. Cane, grape, and fruit sugar. 535. Sorghum wine looking like sherry, was patented by the Rev. Mr. A. Meyers. The stalks give a red dye for silk and wool. Sorghum gives twelve per cent, cane eighteen, beet ten and one-half per cent, maple five, and maize ten per cent of sugar. 536. From the sugar cane is obtained eight per cent, raw sugar two per cent, molasses, left in the bagasse six per cent, and lost in skimming two and one-half per cent. 536. Beet root juice contains: 1st. Pure vegetable albumen, coagulated by heat. 2nd. Nitrogenous substances becoming red, brown and black by oxidation. 3rd. Nitrogenous substances like gelatine precipitated by lime. 4th. Nitrogenous substances not yet known which convert cane into grape sugar and hinder crystallization. 537. The success of the beet root sugar manufacture depends on agricultural treatment. The sorghum and imphee furnish a purer juice than the beet. The products of decomposition of grape or fruit sugar present obstacles to the crystallization of the cane sugar. 538. The scum gave on analysis: Gum like

cherry gum fifty per cent, chlorophyll ten, albumen twenty three, phosphate of lime three, and silica fourteen per cent. 1863. Nothing. 1864. Names of sorghum and imphee. 62. Cane mills. 73. Evaporation. 76. Steam coil evaporator. 81. Continuous process in the Jacob's. Dr. Harris's or Cook's pan. Jacob's pan is inclined, has wooden cross bars and sides permitting the juice to run underneath. Dr. Harris's pan has a sheet iron cross partition. Cook's pan is larger than the furnace and has the cross partitions alternately so that the juice has to run from one side to the other.

1865 — 46. The beet root from Chatsworth Illinois, contained eleven per cent sugar. The 45th degree is the north limit of the successful beet culture. 417. Beet contains: casein, gum and albumen one-half per cent, starch one per cent, sugar 12, water 82, minerals 3. 301. Description of sorghi. 302. Key to sorghum. 303. Illustrated description of sorghum, imphee, early sorghum, otaheiten, white imphee. 306. Black imphee, red imphee and Liberian. 308. Dextro-glucose and laevo-glucose or fruit sugar. Cane sugar is converted into glucose by acids or air, the change is greater as heat is added. Alkalies or chlorides thereof do not convert but hinder crystallization. Two parts of chloride of sodium or calcium combine with sugar which will not crystallize. One part of salt retains three of cane sugar. 309. Sorghum cane after freezing, will ferment, so it will at 60 degrees, when exposed to air. When unclean, the vinous, acetic, lactic, mucic, or putrid fermentation will readily take place. Salts and azotized matters also convert the cane into grape sugar. 311. The soil must not contain potash or azote. 314. Bisulphite of lime and lime for defecation. 319. D. M. book of Mansfield, Ohio, continuous evaporator is the best.

1866. 48. Partially dried sorghum canes yielded Jan. 23rd. cane sugar eleven and glucose nine per cent.

By defecating and evaporating the juice the whole was turned into glucose. 49. Every individual consumes yearly twenty five pounds of sugar, not one-third is produced. Sugar from maple and sorghum does not pay. Beet sugar is no experiment. North of Mason's and Dixon's line beets may be raised. (South of 45th Parallel.) 50. The long yellow turnip beet yields seven per cent of cane sugar. If the growth of the beet is delayed, cane sugar is changed into glucose and lactic acid. Ammonia favors this change. Potash is good. Guana is bad. The natural acids, malic and tartaric, of the beets may result from the oxydation of the sugar. Potash, (by neutralizing the acids) might hinder the change.

At Chatsworth, four months delay, diminished the cane sugar, but one per cent, is in favor of beets. 187. Youngman's evaporator beats Cook's made by Mead & Holmes, Rockford, Ill. Two are defecating pans, one evaporating, and one finishing pan. The finished syrup flows out in a continuous stream. From the evaporating pan it is passed through a charcoal filter and then into the finishing pan. 1867. 40. Diagram of rain and sugar. 46. Sugar and acid, are derived from Cellulose. 47. Sulphuric acid as a defecant and preservator. 49. Different methods for obtaining the juice. 51. Ninety parts wood charcoal, five parts superphosphate of lime, five parts sulphate of alumina, boil, heat, dry and ignite. Use two and one-half per cent instead of bone black. 1868. 164. Waghausel, the largest factory, works up sixty six thousand tons yearly. 343. Sucratation described. 348. One hundred and sixty pounds are deducted from the ton for dirt. 349. — Gennert at Chatsworth made the next attempt. Bonesteel and Otto at Fondulac. Capital twelve thousand dollars. 1870, 212. Alvarado Comp. A three story building, fifty by one hundred and fifty. Boiler house fifty nine by fifty. Bone house 75 by 40 feet. Price of beets, \$3.50 a ton.

Experiments on Sugar Manufacture.

Feb. 13, 1873. Beets from Mrs. Herbst, small, round and white, weighing about one pound, twelve ounces, were cut and dried in a pan in the oven. The dried residue amounted to thirteen drachms. Of these were pulverized enough to weigh ten and one-half drachms. These were extracted with alcohol, say twenty fluid oz.

Alcoholic extract obtained, amounted to twenty six grains. Taste sweetish, sticky, tenacious, color yellow, smell beet like. The color was extracted by sulphide of carbon, was yellow, acicular crystals formed in the solution, and a resinous substance seemed to be dissolved in it, water caused a milky precipitate.

Watery alcoholic extract. Two parts of alcohol and one of water were mixed and percolation continued until about twenty fluid ounces of liquid were obtained. This was evaporated and six drachms and thirty six grs. of extract were obtained, like dirty candy, very stringy and tenacious.

Alcoholic extract from the proceeding hydro-alcoholic extract. Alcohol was poured on the preceding six drachms and thirty six grains, and forty three grains of extract obtained; soluble in water excepting a few flocculi amounting to probably one-half grain.

The alcoholic extract must have consisted principally of Grape sugar, heating it, it melted, gave out gases, became black, smelled of burnt sugar and left a large quantity of porous carbon. After being exhausted with sulphide of carbon it was dissolved in water, filtered and again evaporated; proved inverted sugar.

The first alcoholic, extract principally grape sugar formed while drying the beets, (26 grains.) While the second alcoholic extract formed while evaporating the hydro-alcoholic tincture to an extract 43 grains.

All extracts amounted to seven drachms, twenty six

grains is one-sixteenth of the whole. Hence drying beets will convert one-sixteenth into grape sugar, provided no grape sugar exists in the beets. Forty three grains is one-tenth of the whole: hence evaporating juice on a common fire would convert one-tenth into grape sugar. The inverted sugar was brown, taste sweet and burnt, sticky and molasses like. —

Experiment second. — To determine the quantity of

Sucrate of lime. — To determine the quantity of

Feb. 15th 1873. A beet with a red skin, but white inside, was grated and expressed, water added to the pulp and again expressed. The juice was treated to a little lime; on standing a little it became clear and filtering it we had a transparent solution. This treated to more lime, the solution was yet transparent until it was raised to the boiling point, the solution turned brown and a precipitate of insoluble sucrate of lime formed; this insoluble sucrate of lime is nothing but carbonate of lime formed by the atmosphere decomposing at a boiling temperature the soluble sucrate, sugar being set free and the carbonate of lime precipitating.

The taste is earthy, looks clayey, not sweet, and sulphuric acid added effervesces very much. Hence the precipitate formed by boiling a solution of sugar and lime is nothing but carbonate of lime.

Experiment third. Calcium hydrate dried.

Lime was burned in the stove slacked with warm water, then poured off and evaporated to dryness. Preserved in a well stopped bottle.

To this calcium hydrate, sulphuric acid added effervesced, denoting carbonic acid. Hence calcium hydrate requires to be dried quickly and away from the air and well stopped up.

Lime that had been partly burnt, then subjected to water, but did not slack this on being heated again answered the purpose of chalk. Hence chalk formed from

lime having been subjected to internal heat driving off its carbonic acid in part, then hydration took place slowly and under pressure.

Experiment fourth.

Calcium hydrate was placed into a tube percolator & juice already defecated was poured on. The percolate was sweet and clear, must have been calcium succrate because boiling precipitated carbonate of lime; and the lime in the percolator becoming less, shrinking from the side of the tube. The lime remaining the percolator was carbonate of lime, it effervesced with sulphuric acid and had no sweetish taste. Hence, sugar combines with lime in the cold, heat is not necessary. This succrate of lime is very soluble and passes into the percolate. Carbonate of lime alone remains in the percolator.

Succrate of lime is hence very soluble, clear and transparent, readily decomposed by boiling in contact with the atmosphere. The insoluble carbonate of lime may possibly be soluble in a solution of sugar the same as magnesia is soluble in carbonic acid water. According to this the mono-basic succrate of lime might be nothing but carbonate of lime dissolved in a solution of sugar.

Experiment five. Glucate of lime.

Calcium hydrate added in excess to a solution of sugar (depurated juice) the lime disappeared after boiling a while and a dark solution was obtained, filtering this a nicely colored clear liquid was the result. Alcohol caused a precipitate before filtration from the original juice. Sulphuric acid gave a precipitate with the clear solution, hence proving it to be a combination with lime. The solution has an ugly burnt smell. There may be different substances in this solution.

Experimental Investigations
regarding the
Sugar Beet.
1873.

These investigations may be divided into: 1st. A minor course. 2nd. A major course. The minor course is to establish land-marks, here and there for guidance, or points d'appiere, executed with imperfect and few apparatus, such as may be got up without any outlay.

The major course should be conducted with perfect apparatus, small and cheap, but giving perfectly reliable results. Both courses may be conducted simultaneously.

Question: — How can beets be washed, grated, pressed, clarified, saturated, evaporated, under vacuum, filtered, and crystallized? 1. Grate by hand. 2. Express by lever. 3. Boil and skim. 4. Saturate with two per cent of lime. 5. Saturate lime by carbonic acid from limestone and sulphuric acid. 6. Filter through bone black. 7. Evaporate until 50. 8. Filter again through bone black. 9. Evaporate in a retort connected with an air pump. 10. Let crystals form in a conical mould. 11. Displace syrup by measis or clear-syrup.

A centrifugal could be constructed to which a high degree of velocity could be given, thus perfect extraction of juice could be secured. The wall of the centrifugal made into depurating and filtering apparatus would yield the juice pure for evaporation.

In the construction of machinery for making sugar, the human body must be taken as the type or model. Every part wants to be constructed small and complete in itself, like the cell, or each globe in the Harrison boiler. So that the enlargement of the manufactory would

require only the addition of parts and not a new construction.

Tools should be convertible. If not well adapted, they become an expense to keep in order, the same as it is with a large house.

The decay incident to everything existing, is the law of limitation of our labors. We should therefore not commence too much, for as soon as we have finished one thing, another demands our attention. The forces of nature that constructed a thing will also pull it down again. Our teeth, hair and stomach require constant attention.

Scientific American, 1860, July. Filtering medium.

Animal or wood charcoal,	50 parts.
Sand,	25 "
Coal tar,	17 "
Fire clay,	.8 "

Calcine the plates to carbonize the tar made of the mixture.

The knife must be the starting point to test the slicing machine. The $\frac{1}{2}$ holes punched into a scraper of tin for the grater. Quite primitive tools must be used at first for experiments. To obtain the juice by percolation use a U. shaped tube.

Experiments, Dec. the 10th.

The gratings were percolated from a funnel. The percolate boiled, the black matter coagulated a little before the boiling point; would not filter through paper but very slowly. This was acted on by lime in the first instance would not filter through paper.

The black coagulum from boiling was acted on by water and lime, it did not dissolve very easy at all, but turned whitish. Liquor potassa was next added and boiled, it seemed to dissolve, at the bottom of the spoon seemed to be a slimy precipitate.

Boiling first the juice obtained a large quantity of al-

bumen coagulated, but this was not thrown to the surface at once, but slowly and a little at a time, the most of it would go down again with the current of boiling juice. What would stay on the surface, seemed to do so in virtue of small particles of air mingling with the albumen, and of gases forming in the liquid which rising would bring up the albumen. If therefore a current of carbonic acid gas was passed into the liquid and its circulation main turned through the liquid, then the albumen might be got out in a short time. Adding lime after the albumen had been coagulated did not seem to improve the precipitate, only a small portion of the albumen seemed to rise to the top, but I cannot say that the albumen become dissolved after the addition of lime. After standing ten minutes it became clear on top, the rest was quite sedimentary. —

This leads to the conclusion that the lime to be added should be small in quantity so as to neutralize the acidity of the juice. The boiling should be only instantaneous.

Dec. 11th. A cylinder full of beet shavings were percolated. The first juice ran quite fast. One quart was percolated. Next one pint was percolated, the evaporated thick syrup weighed two ounces to the pint. That of the first quart weighed four ounces. The gratings not exposed to the air did not turn dark, exposing to light had no effect.

Only a few more ounces of sap could be obtained after the three pints above mentioned, it would run no more, water having taken the place of the juice; the gratings swelled so that the water could not pass. The percolate tasted sweet. The drop on the percolate had still a sweetish taste.

The first three pints contained nearly all the sugar, that is six ounces evenly distributed, or two ounces to the pint, that is twelve and one-half per cent. The one-

seventh of an ounce obtained last tasted rather more salty than the other portion. Into some of the sticky mass obtained by evaporation (after dilution with water) lime air slacked in powder was sprinkled on. What fell to the bottom was sticky and trying to dissolve it. The beet pulp was taken out of the cylinder and 1 pint of boiling water mixed with the same, it was now percolated again and a pint of liquid obtained, this gave on evaporation only very little residue, say ninety grains, so that it might be neglected showing that cold water is perfectly able to exhaust the beet pulp without heat.

The pulp after exhaustion weighed two and one-fourth pounds — Thirty six ounces of pulp to six ounces of sugar, that is exactly one-seventh of sugar or fifteen per cent.

Sacharate of Lime.

Twenty grains of sugar were dissolved in two ounces of water shaking and the water filtered. The water evaporated gave a drop of syrup tasting of lime. Much more lime was added and again shook, filtered and evaporated, a drop of syrup remained

Eight oz. of water were added to twenty grains of sugar filtered and evaporated; a dry pulverized powder remained, after heating turned into a voluminous charcoal just as if it wanted to explode; may be if much was heated an explosion might be the result. This powder proved the existence of sugar, also that all the sugar remained in the solution in the cold, in spite of the presence of an abundance of lime.

The remaining sediment of lime in the bottle did not turn dark on heating showing the absence of sugar. One-half per cent of sugar in lime water. Lime water has nine grains lime to the pint therefore two ounces contain 1.88.

I added four times as much lime water, making at least four per cent or eight times as much of lime water

as there was sugar. There must also have been a quantity of dry lime mixed with the triple saccharate.

The filtrate gave with diluted sulphuric acid no evidence of lime. Stirring the lime up with the syrup, and filtering gave with strong sulphuric acid, a precipitate that readily dissolved on adding water.

Either the lime has a stronger affinity for the sugar or the weak acid or the sulphate of lime is soluble in a solution of sugar. It may be also that the sulphuric acid has greater power over the saccharate of lime when heat is added as is the case when strong acid is used.

After the coarse lime was precipitated a fine precipitate fell rather more flocculent, what may be clear triple calcate of sugar. In order to get the triple calcate of sugar pure, it would be necessary to pour off on top while the lime and syrup were entering below: —

If now carbonic acid was added to the drained calcate of sugar, sugar would enter into solution while the carbonate of lime would be insoluble.

The filtrate perfectly clear but dark colored gave a voluminous precipitate with alcohol, so it did with the soluble saccharate of lime I had from some time ago. All the mono-calcate of sugar cannot be converted into the triple insoluble calcate of sugar.

Heating the mono and soluble calcate of sugar it become insoluble showing that the soluble calcate had become decomposed into the insoluble triple calcate and into the soluble mono-calcate remaining still in solution. As soon as the above had become cooled down to seventy five degrees the whole precipitate had entered into solution without shaking.

What I called the tricalcate of sugar is quite insoluble in cold water. Alcohol produces no precipitate, but demonstrates the presence of lime water by the greenish color; it may therefore be no combination

of sugar at all but simply lime. But since it looks gray it may be possible that when in the state of lime water it combined with coloring matter, or that it pulled down the coloring. I next precipitated the soluble calceate by alcohol, the precipitate readily dissolved again in water.

By heating a solution of sacharate of lime under pressure so that no ebullition would take place and then letting off the top water with all the impurities, then the calceate might be decomposed in the cold and after clarifying by rest, evaporated in a vacuum.

The question is, can all the sugar be turned into the calceate and then be precipitated, or while a precipitation is effected some of the sugar goes into solution as sugar what previously was a calceate? thus three equivalents of mono-calceate of sugar form on heating one equivalent of a tricalceate, while two equivalents of sugar go as sugar in solution? —

Sacharate of lime evaporated and charred gave a nice bone black what possibly might be used instead of animal charcoal. — The more lime there is in the powder, the looser will be the grain. —

Evaporate the juice with lime sufficient to form the tribasic calceate without any process whatever. Wash the calceate with water to remove the soda, potash, etc., then decompose the calceate with carbonic acid and the syrup obtained, treat as usual. Heating beet juice with an excess of lime a voluminous precipitate formed, the clear liquid filtered off proved upon evaporation, the presence of sugar which escaped the action of lime.

The Fey-Jelinesk process is to convert all the sugar in the juice into the insoluble sacharate of lime, as soon as it is heated to the boiling point so that further boiling cannot act in an injurious manner upon the sugar. The

asparaguin and betain are converted into ammonia by boiling in the presence of lime. The sacharate is afterwards decomposed by carbonic acid.

Experiments with beets. Jan. 30th, 1874.

Experiment 1. Ten pounds of juice and eight pounds of pulp were obtained by grating and expressing with the book cutting press.

The juice was raised to a boil, the scum amounted to eight ounces. Two and one-half ounces of juice drained from this in twenty four hours. The five and one-half ounces remaining, contained still a large quantity of juice, so that it ran quite easy through the rent paper. When the juice was further boiled new scum arose, so that a whole saucer full could be skimmed off, at first the scum was dark, afterwards became more brownish. After it had been condensed to a syrup half of it had turned to a brown froth. The remainder was a cupful of very brown molasses.

Experiment 2. Eight pounds of juice had three oz. of lime mixed with it, no scum came on the top. It was next drained from a bag, very ugly looking indeed and its stickiness prevented evaporation. The part drained looked nice and clean, and what was most remarkable was that no scum formed on the top.

The dregs were afterwards pressed, this being a dirty job, five and one-half ounces of dry substance of lime was obtained. The syrup was evaporated without any scum until at the bottom granular crystals in abundance could be seen, these crystals apparently tasted quite sweet, so that I took them to be sugar.

After the syrup had cooled down, the crystals were again dissolved showing that they were sacharate of lime. Above those crystals a dark syrup floated, but by far not so dark as the syrup boiled without lime. The dregs are quite considerable and to get rid of them is an important consideration. If now the dregs were mixed

with fresh juice, it might possibly answer another time and so the labor of getting rid of the dregs be reduced. The clear syrup might be drawn from the top of the pan, some new lime added, and the pan filled up with juice, again raised to boiling, the juice drawn off again and so continuously for several times, until the dregs would lessen the contents of the pan too much.

The first scum might be returned to beet pulp to be pressed. A supernatant syrup may be necessary for the precipitation of the sacharate of lime. Keep adding lime and syrup.

Experiment 3. Ten pounds juice, lime three ounces, on mixing the juice with the lime a strong smell of ammonia was developed so that I could hardly endure to smell it.

Before the lime was added, the juice was boiled and skimmed, the scum amounted to one and one-half oz. The lime and the juice were boiled for an hour and still ammonia was disengaged. This ammonia originated from other than soluble albuminous substances. Lime of a very sticky nature was found on the bottom of the pan. (Was there any sacharate about it?)

Evaporation gave again a scummy mass, not at all as was expected. And as was the case when the lime was added before skimming.

Experiment 4. Ten pounds juice were mixed with three ounces hydrate of lime, after filtration the filtrate was evaporated, boiled without giving any scum, and after being evaporated up to a syrup a large quantity of gritty sediment formed (sacharate of lime) which dissolved again as soon as the syrup had become cool.

Trofe., The lime combines with something, what by boiling without lime becomes soluble and gummy, or turns into the scum-generator, and what when once soluble cannot be annihilated by lime anymore.

Druggist's Circular, Oct., 1873. Paste of paper as a clarifier of sugar. (Sugar 20,000 grains, water 10,000, paper 24 grains.)

Scientific American, Nov. the 25th, 1872. Schwarz heated animal matter with spent bone black to revivify it. Organic matters answered gum gluten.

Scientific American, vol. 4, June, 1861. Filtering medium. Dallike found bog head coal after calcination excellent. — Mix clay, lime, and camel coal, burn them in a retort. — Dahlke's silicated carbon filter. S. A. Oct., 7th, 1865, page 225. Revivifying animal charcoal. Have the charcoal dry and hot, pass dry hydrochloric acid gas into it; mix with a portion of untreated charcoal and wash out the chloride of calcium, then burn the charcoal as usual and it has gained one hundred per cent. This is Beane's Process.

Scientific american 1872, April 13th, page 245. A pourous filter will convert albumen into ammonia by passing through. Ure's Dictionary, page 781. To defecate saccharine liquid use a phosphate of some base. Use acetate of alumina, lime to separate alumina; superphosphate of alumina will remove last of alumina; neutralizing acidity by aluminate of lime. Hydrate of alumina may be recovered. Six pounds of alumina dissolved in phosphoric acid for each ton of sugar. 782. Preparing phosphate of alumina. Burn bones white, powder, digest with muriatic acid, dry; add sulphuric acid to combine with all the lime and strain. The liquid is to be combined with alumina, if need be, add phosphoric acid to complete solution.

Aluminate of lime dissolve alumina in caustic potash and precipitate by lime, wash. Bichromate of potash is a test for cane sugar.

Chemical Technology, page 263. Sulphite of alumina for purifying beet root juice.

Chemical News, 1873, Jan., page 263. Animal char-

coal abstracts ingredients similar to what sulphide of carbon would do and from knowing the action of sulphide of carbon, that of charcoal may be inferred. Animal charcoal, its porosity is essential. It is not carbonic acid (Anthon) or ozone condensed which makes it act. It is the endosmose of the cell letting sugar and water (the crystalloid) pass and retaining the colloid. Cotton, wool, vegetable and animal charcoal, and alumina absorb colors. Animal charcoal absorbs about one-tenth of the impurities of the beet juice. This it does in virtue of the ingredients it is composed of. Its carbon absorbs the coloring matter, and its lime, the lime salts of the syrup. Betain and asparagin pass through the filter. Asparagin is converted by the ammonia, into asparaginate of ammonia, which is again decomposed by heat leaving the asparaginic acid.

Stammer v, page 128. Tribasic sacharate of water. Tribasic sacharate of water and lime. VIII. Tribasic sacharate of lime. 206 - 213. Pectin sugar. VI, 169. Asparagin generates ammonia. IX, 23. Betain and asparaginic acid. XII, 167. Sacharate of lime. X, 230. Betain is three dollars per pound in syrup. VII, 200. Sacharate of lime. 205. Ulmin.

The Sugar Beet.

Its introduction into Ozaukee County. In the year 1873 in March I procured from Vick 8 lbs. of Knauer Imperial beet seed, from Brigg's 4 pounds of Imperial, from Thurborn two pounds Silesian and one pound yellow; from the Patent Office, four pints of Vilmorin and two pints white Selesian, (imported from France); from Bliss, one pound of Lane's Improved.

These seeds were put into $\frac{1}{2}$ ounce packages and distributed to three hundred and ninety farmers. Most of them took but one package, enough to plant a rod, a few engaged to plant three or four rods. The farmers did

not keep the varieties sufficiently apart.

It was strange with what reluctance and suspicion some of these farmers would engage to plant a rod of ground. September 15th, 1873. Knauer's Imperial is a large long beet, a few inches above the ground, some of them with reddish leaves, the others green as usual. Beets weighing two and one-fourth pounds would yield a juice having a specific gravity of 1.072.

September 15th. Vilmorin is about one third smaller than the Knauer's Imperial. It has two deep ridges on the sides full of small rootlets, the main root is also apt to be divided. It does not come above the ground as much as the preceeding variety. Some of its leaves are very curly, delicate, drooping and slightly tinged red. The juice turns very quick almost as black as ink. Average beet one and one-fourth pounds. Specific gravity 1080.

November 2nd. White Silesian from the Patent Office. Beet short and crabby, turnip shaped with plenty of rootlets, weight one and one-fourth pounds. Juice is not apt to turn dark and its specific gravity is 1.076.

Imperial from Brigg's. The nicest of the beets were $\frac{1}{2}$ inch above the ground, smooth and long. Weight above the Vilmorin and below the Knauer, one and one-half pounds. Specific gravity 1,068.

Lane's Improved Imperial. Large, equal to Knauer. One-half of the beet is above the ground. Specific gravity, 1064.

White Silesian from Thorburn, is wedge shaped, short, and a little larger than the Silesian from the Patent Office.

The average of specific gravity of ten trials would give for Vilmorin 1,070, Knauer 1064, Silesian 1064, Brigg's Imperial 1063, Silesian from Thorburn 1058, Lane's Imperial and Yellow long beet, 1058.

A long yellow beet grated from the top would yield a

juice having a specific gravity of 1050; grated from the middle 1,040; grated from the root, 1042.

The diameter was to the length in Knauer's Imperial as two is to five; in the Vilmorin as four is to eleven; in the Silesian as five is to nine and two to three.

September 7th, 1873. People commenced bringing in the twenty beets for each package. The beets that had been growing on swampy ground were crabby and bursted open and no good for seed. (Schanen.) From sandy soil (Kuhn A.) the beets carried an excess of small rootlets. All the beets that had been transplanted were crabby.

The average Vilmorin from Joseph weighed one and one-fifth pounds. Average Silesian beet from our garden weighed one and six-seventh pounds. Vilmorin our garden one and one-half pounds, Knauer our garden two and one-fourth. Average of Lane's Improved in our garden two and one-third pounds. Average beet of Brigg's in our garden, two pounds. Coady planted his beet seed in June, the specific gravity of the juice was 1048. Wittman's had pulled the leaves from their beets, weight of beets three and one-half pounds. Specific gravity, 1040. All of their beets had been transplanted.

In the year 1874, people were not personally urged by me but through my Journal, the result was that but about fifty persons took any seed at all and but a few returned beets for it.

Joseph Altendorf planted 1,660 square rods with Knauer yielding 167 pounds to the rod or 15 tons to the acre. He planted a second field, 1,240 rods with Vilmorin, yielding per rod 123 pounds or eleven tons per acre.

The seed beets were floated in a tub of salt water and thus the specific gravity determined. The salt water

seemed to be injurious to the beets of the Knauer variety, a single one went to seed, this being of a specific gravity of 1,068, produced seed very large and in abundance. This beet was the nicest of the lot. The Vilmorin beets showed also a specific gravity of 1,068, of which a number came to seed; the seeds being small. One Silesian beet very long came to seed, this seed being the smallest of the whole. ~~————~~

In the year 1875 no new seed was raised, the seed beets did not come up, they were probably injured by the salt water. — This year's experiments in planting were confined to the exertions of Joseph Altendorf. He planted several rows of the Knauer seed of 1,068 specific gravity, which alone proved satisfactory in the yield: The beets were large, long and clean. While the Vilmorin and Silesian also from the new seed, proved no better than the year before, crabby and small.

Moderate Stimulants.

If the stomach be not an exception to the general law of the action of stimulants upon the animal body, we should expect that, by the habitual over-excitement of its functions, in however trifling a degree, its vital energy must undergo a premature depression; and that the result of a "moderate" use of alcoholic stimulants will manifest itself, sooner or later, in diminution of digestive power. Treble the amount of our daily consumption of tea would induce paralysis, and any quantity sufficient to stimulate would have a tendency in the same direction. Certainly, children ought not to be suffered to drink either tea or coffee, if at all inclined to be nervous:

**The course pursued by
Millionaires,
* or men that made their mark.**

By

Dr. J. T. Scholl.

Ozaukee, Wis., April the 6th, 1876.

Stephen Girard born at Bordeaux France, 1750, and died in 1831 in Philadelphia. He was the son of Captain Pierre Girard, a sailor. At eight years of age he discovered his blindness with one eye, he grew short & stout and of an ugly apperance. Knowing his unpopularity, a set of traits grew upon him as a consequence of such knowledge which were not calculated to show favors to anyone. The education of traits at all amiable were entirely suppressed in him. Having nobody to care for him, he also cared for nobody else, and since his own person was held in objection by himself, he cared little for personal comforts.

The greatness of a man centres in his possessions. These possessions may belong to the body and reside in personal appearance, or they may be in possessions of the mind, that of intelligence and culture, and lastly possessions of outward circumstances or riches, represented by money. Each of these possessions is a powerful lever, levers that move the world, but the levers of personal appearance and intelligence vanish with their possessors, riches only will be kept by the heirs and be a subject of further talk.

* See, "Great fortunes, and how they were made, or the struggles and triumphs of self made men," by J. D. McCabe Jr. Chicago & Cincinnati. E. Hannaford & Co. 1872.

Now Girard could not wield personal appearance, nor intelligence, therefore his only anchor was money. Money he wanted to move the world, to make people bow to him. Here centered all his greatness and so he bent all his powers to one purpose, to that of making money, like the sun's rays are bent in a burning glass to one point constituting a focus, so here every cent was put up as an addition to his wealth. Just as a certain gentleman H.—— would appear what he is not, so must Girard have had certain traits that induced him to hoard money for charitable institutions after his death. Since he did not expect the sympathy of the contemporary people, he thought to lay claim to the sympathy of the post-temporary generations. — The prime moving spring in him was at first or in his manhood to acquisition of money for the power it would give him over people, and in age he turned it to prove his injured innocence, or to be in death, what he never was in life. †

In 1773 Girard commanded a small ship from New Orleans to a Canadian port, and in order not to be captured as a prize by the British Cruisers, since the war had broken out between the mother country and the colonies, he run up Delaware bay and on reaching Philadelphia, he sold the ship, a share of which was his, and commenced business with the proceeds. It is likely that he was not very scrupulous in this transaction as well as in the one with Saint Domingo, which put fifty thousand dollars in his coffers. Here he commenced dealing in claret and cider which he used to bottle himself, and probably adulterate a little, here he made his first profits in a disreputable business.

Next year 1777 he married Mary Lum a beauty, that went crazy after seven years marriage and had to be taken to the State Insane Asylum, and afterwards she was placed permanently in 1790 into the Pennsylvania Hospital where she died in 1815. Love proved but a

short lived delusion to him, and being childless, nothing remained for him but to amass wealth as a means of power. — In 1780 he entered again upon his New Orleans and St. Domingo trade. His success enabled him to enlarge his operations year after year. In 1772 when times were hard, he saw better times ahead and so leased a range of buildings in Nater street for ten to twenty years which brought him an enormous profit.

In 1790 when he could not agree with his brother and the short lived partnership for the West India trade was dissolved; he counted his profits at thirty thousand dollars. In the time of the insurrection at St. Domingo, a lot of valubles were placed on board his ship for safe keeping, which were taken to Philadelphia, and soon after sold for fifty thousand dollars which went into his coffers.

The next year he commenced building the splendid ships that enabled him so successfully to engage in the Chinese and East India trades.

His manipulations soon became studied and complex. A ship with grain he would take to Bordeaux, & take for it wine and fruit, which he would sell at St. Petersburg for hemp and iron and sell them at Amsterdam for coin; with this he would buy in China and India teas & silks, which he would sell in Philadelphia. His instructions to commanders of his ships were full and precise, and a scrupulous exaction of them was in all cases strenuously demanded, and the object of the trip was to be kept profoundly secret. A sort of strategy peeps here, out of his actions, he was wont to mislead others as to his operations. His being a rich man, led his employees to expect more from him than he was willing to give. Faithful services and personal sacrifices were not extra rewarded, although that was undoubtedly expected. With strategy he treated outsiders, and his employees. — If he wanted tea or coffee, he would pretend to want

sugar and molasses. — In 1812 Congress would not renew the charter of the old Bank of America so he purchased the same inclusive of the cashier's house for one hundred and twenty thousand dollars, and in May opened the Girard Bank with a capital of one million & two hundred thousand dollars. The old officers he retained, and to Simpson the cashier he owed much of his success. He would offer grand accommodations to small traders, encourage new beginners, and discount small notes. On the new beginners he would glut in the wreck of their ill-planned speculations, and with small notes he could extort the highest discount, thus he would gain what others would lose, and an honest equivalent was probably seldom rendered in his scheme, so that his system was one of honest stealing, hardly to be encouraged.

When in 1814 the British forces had burnt Washington and the American Government called for a loan of 5 million of dollars, Girard subscribed for the whole amount. He also subscribed one hundred and ten thousand dollars for rendering the Schuylkill navigable. Thus he upheld the Government and furthered public improvements, but probably only for the purpose of making his own possessions secure, and for making them more valuable by the growth of the country. Looking at the growth of the country and furthering it by improvements was really turning an honest penny, so that some good quality may be found in sordid selfishness.

In 1728 he was worth ten millions, yet he was a solitary old man not to be envied for his riches, he was repulsive and liked by no one, he used to live on less than his clerks, he gave no charities and derived no benefit from his wealth excepting the gratification of possession and posterity was to be his only reward. — When in 1793 the yellow fever broke out in Philadelphia which rendered houses tenantless and deserted, he and Helm volunteered to take charge of the Pennsylvania Hospital

where he displayed great courage and personal self-sacrifice. In 1797 and 1798 the city was scourged a second time he again assisted at the hospital. "Braving death because he did not value life." — When he died in 1831 he left to his brother and eleven nieces, sums ranging from five to twenty thousand dollar. Thirty thousand dollars he gave to the Pennsylvania Hospital, smaller sums to other charitable institutions. The bulk of his property, about six millions, was left to trustees for the execution of the Girard College for orphans to perpetuate his name to remote ages to come.

John Jacob Astor was born in Waldorf, Baden, in July 1763. His father was a protestant butcher by trade. At seventeen years of age he left home to go to his brother in London, who was working with his uncle, making musical instruments, two years later 1783 he started for America. While lying icebound in the Chesapeake, one day's journey from Baltimore he formed an intimate acquaintance with a trader in furs, who told him of the large profits that could be made in that line. Arriving at New York his brother a prosperous butcher, assisted him to a place in Mr. Browne's, a dealer in furs, for whom he afterwards made purchases and thus he became fully conversant with the trade. Furs could be bought cheap for trinkets, mere tritles, cakes, and a glass of whisky and sold to New York dealers at a handsome profit, but the best market was London. The fur of a beaver costing one dollar in New York, would bring six dollars in London.

— The principle of money-making implies the supply of a demand. Furs were valueless to the Indians and were cheap, while in London they were in great demand by the rich, and therefore brought a high price. There was also in one place an unsupplied demand, and in another place a superfluous supply. The water of a

stream exerts a force only when it passes from a higher to a lower level and the more abrupt this passage is, the greater the force that is exerted. Just so in commerce, the passage of products from the wildest people, to the most civilized, would bring the greatest profits. To produce a high fall of water, it is necessary to have a high dam, which is difficult and expensive to construct, and which is easily injured or carried away, of which Astor is a reminder. Just as a waterfall may vary in height, so it may vary in volume, and while Astor in his first efforts made use of the first principle he also made use of the second principle, that of quantity in his latter operations; he made use of big ships, to carry large loads at a time. — This would involve the principle of equalisation of distance, we must next assume a principle of equalisation of time including several factors, by selling to somebody, younger than me, or less instructed than me, anything or service whatever I bring him up to me and for this equalisation he pays me a remuneration, also he has to pay for his ignorance and inability, he is younger, behind, less informed, less intelligent, and for this difference he has to pay, while in turn some day to come he himself will put others to a similar test. One person is hence living upon the disadvantages of the other; but when a just and reasonable equivalence is rendered, then the operation is honorable. On the other side of the equalisation of time is to foresee condition that will exist at some future time, and be prepared to meet existing wants at that time. A knowledge of the future is here demanded, and the ignorant man cannot step into this branch of acquiring wealth.

The increase of population for a number of years, and the demand for this or that commodity can be calculated in advance, the life of young persons up to twenty years, is calculated only to consume; the producing class has herefore the advantage of them.

The production and distribution of value is the principle underlying the science of wealth. —

King Charles, the 11, had conferred the hunting grounds of the British possessions to Prince Rupert, and under this charter the Hudson Bay Company carried on the fur trade. The Canadas were held by the French who traded with the Indians at first, who afterwards settled among them as hunters and trappers. In 1773 the French possessions were ceded to the English and then the North West Company was organized.

The Mackinaw Company was also English. — In the face of these hostile companies young Astor left Bowne and established himself on Water street with a capital of a few hundred dollars. His store was supplied with toys and notions suited to the tastes of the Indians selling furs. In winter time he would make journey's on foot into the interior, and buy furs from farmers and Indians where he could get them. These furs he would take personally to England and sell them at a fine profit. Business connections thus sprung up which enabled him to consign his goods to houses there and draw on them. He also became Agent in New York for the sale of musical instruments from his brother Astor and Broadwood, London. About this time he got married to Sarah Todd of New York. In 1794 Jay's treaty placed the frontier forts into the hands of the Americans, and thus Astor was enabled to extend his operations and send his Agents on long journeys, which he had made himself before, and soon he purchased a ship to send his furs to London. In 1800 after having been in business for fifteen years, he moved to 223 Broadway, the site of the Astor house of to day.

— At this time he was worth a quarter of a million. A beaver skin that could be bought for one dollar of the trappers could be sold in London for six dollars and twenty five cents, and invested in English goods, would

handsomest men he could find. This plan proved successful with him and has found universal favor in modern times. The financial crisis in 1837 did no injury to him, by watching things closely he was prepared to meet it. He began to "sell for cost" and was thus enabled to sell goods to the amount of five thousand dollars a day, while his rival merchants were obliged in their stringency to sell their goods at auction sales, thus he bought fifty thousand dollars worth of silks at auction, and sold them again in a few days, making a profit of twenty thousand dollars. When the war broke out he had engaged the products of the manufacturers, so that his profits in furnishing army supplies was immense. His fortune after the war was estimated at from twenty five to forty millions, made honestly by himself in half a century: He was a strong believer in luck and lucky persons. His business habits were most strict. He had a time and a place for everything, and the same was demanded of his employees. He was the hardest working man of the establishment. — The greater bulk of Mr. Stewart's fortune is invested in real estate. His nature was exceedingly liberal, during the war he sent a cargo of provisions to the needy in Ireland, and invited others to take passage free of charge. One hundred and thirty nine persons came thus to America, for which he procured situations at the same time. —

Grant nominated him as Secretary of the Treasury; but owing to him being a merchant; the post was relinquished.

His retail store is the wonder of New York. It is built of iron, five stories high with two cellars underneath; two hundred feet fronting on Broadway, and three hundred feet on ninth and tenth streets. The rooms are heated by steam, engines are at work to fill the large tank at the top with water, and for hoisting purposes 6 elevators (three for passengers and three for goods,) are

employed. It is lighted by several thousand gas jets lighted by electricity. There are two thousand and two hundred persons employed. There is one general superintendent, with nineteen assistants, every one of whom is at the head of a department. Nine cashiers receive and pay out money. Twenty five book keepers keep the records. Thirty ushers direct the customers to the departments they seek. There are two hundred cash boys, and four hundred and seventy clerks. Fifty porters do the heavy work. Nine hundred seamstresses are employed in the manufacturing department, and about 500 other persons are employed in various capacities.

The sales of a day average sixty thousand dollars, of which fifteen thousand dollars are received for silks, six thousand for dress goods, three thousand for muslins, carpets fifty five hundred, laces and velvets each two thousand, furs, embroideries and gloves one thousand each, shawls twenty five hundred, hosiery, boy's clothing and notion of each six hundred dollars.

The clerks receive from five to twenty five dollars a week, the cash boys five.

Two experienced detectives stationed at a private door have to observe the employees when leaving the store, so that nothing is carried off what does not belong to them. — Fifteen thousand persons visit the store on an average per day. The subcellar is the general store room for goods in boxes, here they are unpacked. The basement is used as a carpet salesroom. The first floor is the general sales room, provided with one hundred counters, fifty feet in length. The shelves rise but a few feet above the counter.

The second floor is taken up with ladies suits, shawls, curtains, etc., the third floor is used for a similar purpose, the fourth for making up suits, the fifth is the fur room and upholstery manufactory, and the sixth floor is occupied by the laundry. — The goods are made up

bring ten dollars in New York.

China was also an excellent market for furs, and the proceeds invested in teas and silks, sold well in New York. His profit on a single voyage would sometimes amount to seventy thousand dollars and would average thirty thousand dollars. He made about two millions on his furs and teas, and the rest of his fortune, eighteen millions more was made on real estate. The Astor estate is worth forty millions now. — As a rule he bought his lands in the suburbs of the city. Seven thousand and twenty houses figure on the rent role of the Astor estate at present. Ar. Astor bought Richmond Hill, the estate of Aaron Burr for which he paid one thousand dollars an acre, for one hundred and sixty acres, and 12 years later a single lot was worth fifteen hundred dollars. In 1810 he sold a lot on Broadway for eight thousand dollars, and invested the receipts in lots above Canal St. and while the lot he had sold increased in a few years to twelve thousand dollars, the lots he bought had increased to eighty thousand dollars. The confiscated Morris estate, consisting of fifty one thousand acres of land he bought of the heirs for twenty thousand pounds Sterling in 1809, and in 1827 he received five hundred thousand for them from the state of New York. Mr. Astor matured a plan to establish a Town at the mouth of the Columbia for extending the fur trade, he argued that China could be reached from the Pacific and thus a circuitous route could be avoided. A company was formed at the head of which stood Astor. Two expeditions were dispatched, one by land and the other by sea, who succeeded, after immense hardships, to establish a settlement at the mouth of the Columbia. However the partners of Astor sold his property to an English rival company, for a mere trifle. The loss to Astor was about one million. The discouragement of the colony may have been due to the war that broke out with England. — He

remained in active business for fifty years. He was universally noted for his calmness of temper. In 1830 he withdrew from business and commenced building the Astor house on Broadway which when complete he gave to his son, William. In 1832 he made a trip to Germany and returned in 1835. He died at the age of eighty four years and eight months, in 1848. The bulk of his estate he left to his son William, and four hundred thousand dollars were left in the hands of certain trustees for establishing the Astor Library. — Times and circumstances are constantly changing. Girard and Astor may have been models to follow in some of their business managements at that time, but they will not do to day, and it is for this reason, that the lives of great men are read without any profit whatever to the general reader. What is wanted is to draw principles out of their operations, and apply those that are good and praiseworthy to our present circumstances.

Alexander P. Stewart born at Belfast in 1802, died 1876. He came to America in 1818, a classical scholar. He commenced a small dry goods store, but on reaching his majority he returned to Ireland to receive the one thousand pounds his grandfather had left him. The principle part of this he invested in trimmings, and with these he started a small store at 233 Broadway. He bought chiefly at auction sales. His first principle was honesty between buyer and seller; his second, was to have but one price; and his third, was to sell for cash. Once a note was becoming due and owing to hard times he almost despaired of paying it when he struck upon a plan what has since become the "selling out below cost" dodge. In 1828 his little store became too small for him and in 1837 his business demanded a five story building. To attract the ladies he employed as salesmen the

in the basement. The ticket accompanying the goods giving quality and price of goods, are verified as to their correctness. The tickets are sent to the checking desk also in the basement, for comparison with those delivered to the cashier.

The wagon department employs forty horses, twenty seven drivers, five grooms, and feeds thirteen hundred bushels of oats and fifty tons of hay a year. The place has a superintendent by day, and a watchman by night.

For replenishing his stores, he had agencies established in Boston, Philadelphia, Manchester, Paris and Lyons who exercise the purchasing function, but his buyers haunt the markets of the world watching for a favorable opportunity to pounce upon a desirable article. All the looms of the above countries are closely watched, and the finest of the goods are bought, as soon as finished. He bought for cash the world over and had thus become a desirable customer everywhere so that he could take his choice. — The duty on his imports averaged thirty thousand dollars in gold per day. — He insured liberally and had policies renewed every third day of the year. While leaning on the insurance companies he was quite independent of the banks, and never called on them to help him through a crisis.

His business steadily increased, and seemed to have no limit in practice,

In "Stewart's System" we find the principle of specialization and organization carried out most successfully.

Stewart's Success.

In the year 1870 there were forty thousand dry goods merchants in the country, and seventy four thousand grocery men. Dry goods was consequently an overstocked field.

His unparalleled success in his vocation is principally due to the subjoined reasons: —

1. To the beginning and growing demand for fineries which he was the first to supply.

2. To his one price system, thus relieving the ladies of the anxiety of being cheated and of bartering, leaving their minds free to choose.

3. The ruin of his competitors he would turn to his advantage, he would buy their stock at low prices, thus he could sell low and run others into bankruptcy. But not only would he pick the best goods but also the best men, that failed for themselves he would take into his employ. Thus he would prove a battering ram on the ocean of the dry goods market, and when he had sunk a ship he would appropriate the best of the cargo and men.

4. He employed men of ability, that had pluck to battle with adversity, their failing in business made them his subjects.

5. He always managed to keep a direct or distant eye on his employecs, and he let them understand they were watched.

6. He realized the importance of understanding the minutiae of a business, and then entrusting them to others, to subdued lions, and watching them closely.

Amos Lawrence, born at Groton Massachusetts, in the year 1786. At twelve years of age he was apprenticed for seven years to Mr. Brazen, who kept a variety store, where among other things, an assortment of intoxicating liquors were kept. Here young Lawrence became quite proficient in mixing drinks for others as well as for himself. Since intemperance was a common habit at that time, he soon fell a prey to the fell monster, and although he laid off the habit when he felt his health going, it had injured his digestive organs in such a way that the foundation of dyspepsia was laid, of which he

suffered severely, while aged, for sixteen years before he died in the year 1852. When his apprenticeship had expired, young Amos had acquired good business habits and after serving a short clerkship in Boston he commenced on his own account.

It was in 1807 when he established a dry goods store. In the first year he made but fifteen hundred dollars. In 1808 he took his brother into apprenticeship, and after six years admitted him into the business as partner, that year his profits amounted to four thousand dollars; and in seven years he made fifty thousand dollars. His principle was never to owe more than sixty per cent of his possessions, and to keep strict account of his affairs, so that he always could tell his standing. It was him that introduced double entry book keeping into Boston. He always was afraid of speculation, and averred that speculation made men desperate, and unfit for legitimate business. During the last ten of his twenty six business years, his yearly income was sixty thousand, most of which he gave away in charities. He gave away six hundred and thirty nine thousand dollars, most of this came to pass the last ten years of his life. He never lost sight of the fact that man is an intelligent being, and is to live for other purposes, than those of making money.

Andrew V. Stout, born 1814, New York City. When fourteen years of age he became assistant teacher, and when eighteen, he became principle of a school. He acted at the same time as contractor for building houses, and when twenty years of age he had made seventeen thousand dollars. (?)

Endorsing a friend's note several times in succession for five thousand dollars, he finally had to pay twenty three thousand dollars, since his friend went bankrupt, and so he remained six thousand dollars in debt. How-

ever he was not dismayed, he worked on, established, a shoe- and dry goods store, and finally became President of the Bank for the shoe and leather interest, which post he is still holding. Although he has been obliged to take partners to his aid, he always kept financial matters, the same way as Stewart, in his own hand. He is charitable, and his riches are immense.

Jonas Chickering was born at New Ipswich, New-hampshire, in the year 1798. Very early in life he became very fond of music, and while learning the cabinet-maker's trade, he had the opportunity of repairing an old piano in the town. This incident created in him the desire of becoming a piano-maker. In 1808 he removed to Boston, still working at the cabinet-maker's trade until 1810, when he succeeded in finding a suitable place in a piano manufacturing establishment. After having made himself fully conversant with the details and workings of the business, which was after he had been working three years as journeyman, he associated himself with Mr. Stewart, and commenced business under the firm name of Stewart and Chickering. At that time the piano was yet a miserable instrument, being originally the successive growth from the ancient lyre, through the harp, praltery, dulcimer, clavictherium, clavichord, virginal, spinet, harpsichord, to the piano of Cristofali.

After a short time Captain J. Macay a retired seaman was taken in as partner instead of Stewart, and his efforts, were of material help to the firm, he conducted the store and finance of the firm, while Chickering was engaged in the mechanical department. After a while, they were enabled to import articles they needed themselves by the shipload. Meanwhile Chickering invented the iron form with cross stays, cast all in one

piece, and the circular scale for fastening the tuning pins in square pianos. In 1841 Captain Mackey sailed for South America for woods from whence he never returned. He now bought the interest of Mackey from his heirs, for several hundred thousand dollars, for which he gave his notes, and conducted the business himself. His sons Thomas and George were carefully instructed in the mechanical department, while Francis was kept in the warehouse.

In 1852 his factory burnt down which proved a loss of two hundred thousand dollars to him. He still kept his three hundred workmen under pay, and proceeded to the building of a new factory, two hundred and sixty two by two hundred and forty five feet, to be built in the shape of a hollow square, 50 ft. 5 stories high containing nine hundred windows with eleven thousand panes of glass, but before the structure was completed he died, which was in the year 1853 from apoplexy. His property at this time was valued at one quarter of a million. His sons carried out his plans and maintain a prosperous business under the name of Chickering Sons, employing five hundred workmen.

Nicholas Longworth, born at Newark, New Jersey, 1782. When twenty one years of age, he removed to Cincinnati, then called the "Far West." Here he entered the law office of Judge Jacob Burnet, and was soon after admitted to the bar. Lands were cheap, ten dollars a lot, and his savings were regularly invested in lots. His first client was the means of his getting into possession of a thirty three acre lot, barren land, and worth but very little. Very soon however these thirty three acres were situated in the heart of the city, and long before his death, the property was valued at two millions of dollars.

The growth of Cincinnati was almost wonderful. In

1802 it had about eight hundred inhabitants, in 1810, two thousand five hundred and forty; in 1820, one thousand and sixty; in 1830, twenty four thousand eight hundred and thirty one; in 1840, forty six thousand three hundred and thirty eight; in 1850, one hundred and eighteen thousand seven hundred and sixty one; and in 1860, (just three years before Mr. Longworth's death) one hundred and seventy one thousand two hundred and ninety three. (In the first ten years it trebled; in the 2nd. ten it multiplied by three and one-half, in the 3rd. ten it nearly trebled, in the 4th. ten it doubled, in the 5th. ten it multiplied by two and one-half, and in the 6th. ten it increased by one-half its former population. It had hence very nearly attained its full growth, which will now rapidly approach.

The growth of a city may be from seventy five to one hundred years, after that a stationary point will have been reached, so that in seven hundred years decay will become apparent, and death will take place in a thousand years.

A perfect parallel we have in the growth of a child with this difference, that one year of the growth of a child corresponds with ten years of the growth of a city. Many a child dies in it's infancy, so it is with a city. It is very doubtful what will become of a child, so it is with a city. A great deal depends on the intelligence of the parents in educating a child, so it is with the men that nurture the young city, if they are intelligent the city will go ahead, if they are not, as is the case at present in Port Washington the city will never pay for the investments. — If the parents die too soon, or the men of science in a town leave it, it will go down, it will deteriorate. The prosperity of a town depends hence on the people that settle in it, if they are intelligent and honest, the town is bound to go ahead, if they are stupid or without principle, the town will never succeed. Where

there is stupidity, rascality will follow. The impostor will flourish among the ignorant. Look at Port Washington: where ignorance and imposture stops all growth and prosperity. Finally when a city is full grown, it is not in need of any further nurturing, it will of its own accord be able to maintain its existence. This parallel may be followed still further. —

Mr. Longworth continued investing in real estate, and was still at the time of his death the largest land owner of the city, in 1850 he paid \$17,000 worth of taxes, while the estate of William B. Astor paid \$23,000. When Mr. Longworth died his estate was worth fifteen millions of dollars.

In 1819 he retired from the bar to attend to his property and to direct his attention to the culture of the grape vine. The Catawba grape was first discovered in a wild state in 1801, near Ashville, North Carolina, near the source of the Catawba river. General Day gave some of the vines to a German near Philadelphia, and from here they got into the hands of Longworth. The Catawba proved so successful, that from hence he let foreign grapes alone, and devoted his attention to the Catawba, to which he afterwards added the Isabella. He established a large vineyard about four miles from the city upon the hill side slope of the river, employing German hands who understood the culture of the grape. He encouraged the growth by others, by paying one or one and one-fourth dollars for every gallon of juice that might be brought to him.

Other gentlemen soon followed in the track of Mr. Longworth in the culture of the Catawba. The Germans of Hamilton Co. soon saw the advantages, and at present thousands of acres are covered with the vine, so that Ohio is vying with Italy and France in the culture.

Mr. Longworth's vineyard was increased to 200 acres, producing 150 thousand bottles of wine per annum. 30

thousand bottles were constantly maturing in his cellar. A chemist from Rheim's superintended the manufacture of the wine. The grape juice while fermenting produced about ten per cent of alcohol, the second year the new wine was put into strong bottles with a little sugar, secured by twine, for a second fermentation. The flavor of the fruit which was carried away with the carbonic acid of the first fermentation, was now retained. At the end of the second fermentation, the sediment collected at the bottom of the bottles, was now shook up every day for 3 weeks and the bottles placed head downwards on a rack; when the sediment had collected against the cork, the wires were cut and the sediment blown out by the gas. A little sugar was added again and the bottle corked up new, when they were ready for the market. "Old Nick" as Longworth was sometimes called, died at the age of 81 in the year 1863.

— In investing in real estate particular attention has to be paid to the rise of the value of it. The real estate has to rise on the average every year, so much that it will cover the interest and taxes, if it does not do that, then it is a losing possession and ought to be got rid of. If my garden is worth one thousand, so would this be equivalent to one hundred dollars of interest, if the garden brings me a value of ten dollars a year, then it must have risen in value to one thousand and ninety dollars in that year, but if it is worth no more at the end of the year, then at the beginning, then I have lost ninety by it. — Just so it is with the most farms about here. The land is worth fifty dollars an acre, and having forty acres a man will clear four hundred dollars a year, counting three hundred dollars a year for his labor, he would have one hundred dollars for interest on his land, while he ought to have had two hundred. The land is hence double the price it ought to be, and such a farmholder ought to sell out.

George Peabody. In the older countries the rich man generally uses his fortune for the founding of a family of note. The money is carefully harbored within the ties of blood, so that the outside world has little benefit of the richness of the man. Sometimes large amounts are spent for securing a title of nobility. Unlike these Mr. Peabody regarded the whole English nation as his family, and his charities went far and wide.

George Peabody was born at Danvers, Massachusetts, in the year 1795. When 19 years of age he entered into partnership with Mr. Riggs, a dry goods merchant of Georgetown, D. C. The next year 1815 the business was removed to Baltimore, and an irregular banking business associated with it, bringing in large returns. He was noted for, "a quick, sound and cautious judgment, for having a decided purpose, energetic and persevering industry, punctuality and fidelity in his engagements, justice and honor in his transactions, and kindness and courtesy in the intercourse of life."

In 1822 branch houses were established in New York and Philadelphia. In 1829 Riggs withdrew from the firm, and Mr. Peabody carried on the business under the name of Peabody, Riggs & Co. The banking business had become quite profitable. — 1836. A branch house was established in London in 1837, and from that time London became his home. That year a crisis set in, and credit, the sympathetic nerve of the commercial world, as E. Everett says, was paralysed.

— 1843. He withdrew from the house of Peabody, Riggs & Co., and established the house of George Peabody & Co. From beginning as a merchant, he slowly merged into the banker, and the bulk of his fortune was made in a banking capacity. In his youth he had contracted habits of economy, jewels he seldom wore, and abominated all display of this nature. He was never married and died in the year 1869. His donations were one hun-

dred to three hundred thousand dollars, to the Homes for the London poor three million, to the Southern Education fund three million, to the Peabody Institute Baltimore, one and one-half million, to Harvard and Yale colleges each one hundred and fifty thousand dollars, to the Peabody Institute, Massachusetts, one quarter million, and other noteworthy donations.

Cornelius Vanderbilt, was born at Staten Island in the year 1794. The only books he knew anything about in after life were the Testament and the Spelling book. When 17 years of age he bought a boat for \$100, and commenced boating in New York harbor where he made \$1000 for each of three summers. Forty other boatmen occupied the harbor, but he alone rose to distinction. The reason of this was: He became the best boatman in the port, was always at his post, and had no vices. At 21 he got married. In the year 1814 he built a little schooner and in 1815 another of a finer model, and prior to 1818 he had earned, boating and coasting, nine thousand dollars, and built two or three small vessels. In 1818 in order to familiarize himself with steam-boating, he entered the service of Mr. Gibbons as Captain, for one thousand dollars, plying between New York and New Brunswick which brought the owner a profit of \$40,000 a year. In 1829 he left Mr. Gibbons refusing to accept a salary of \$5,000. He was now thirty five years old, had been in the employ of Gibbons for eleven years, had saved thirty thousand dollars and was now determined to build a steamer himself. He built a small steamer the *Caroline*, and commanded her himself. In a few years he owned several small steamers, but he was strongly opposed by the moneyed companies, in whom the business rested at the time, this annoyed him very much and cost him most of his earnings.

His officers he selected with the greatest care, paid them liberal salaries, and sustained them against all intrigues. Steadily he rose up in the steam-boat interest until he owned 100 steamers wholly or in part, and he succeeded in driving the owner of the Collins line into bankruptcy. Slowly, however he withdrew his money from boats and steamships, and invested it in railroads and iron works. He controls the Hudson River, Harlem and New York central roads, and moves the stock market at will. Wishing to consolidate the Hudson River & Harlem roads, he applied to the Legislature of New York and succeeded in securing the promise of a sufficient number of votes for the passage of the bill. The stock the Harlem road was sold high in expectation of the passage of the bill, which stock would have to fall if the bill was defeated. The Legislators however had planned to fleece Mr. Vanderbilt, they had determined to vote against the bill in spite of their promise, and in order to make it pay, they sold all the Harlem stock they could get rid off, to be delivered at some future time, when they thought it might be cheap. Vanderbilt, however received reliable information about the scheme to break him, so he took all the money he could lay hands on, and bought Harlem stock and laid it up in his safe. When the bill was defeated, the speculators expected a fall in the Harlem stock, but this did not come, no stock could be got, and so when the time for delivery came, the difference of price in the stock had to be paid to the purchasers. Thus one shrewd speculator lost \$200,000, and Vanderbilt made more in this "corner" than his Harlem stock amounted to. He has four boys and nine daughters, his wife died in about 1868 and about 1870 he married again. He is still a powerful man, with a large cerebral development, and is now the railroad king, whose name is a terror in Wall Street.

Daniel Drew, was born at Cannel, New York, 1797. In 1820 he kept a tavern in New York City and associated himself with two drovers of cattle. Cattle were purchased in Pennsylvania and Ohio, and driven 2000 at a time, in droves of a 100 over the mountains to New York for slaughter. These were the first cattle that ever crossed the mountains, and 2 months were consumed. The profits on the venture was very large. This business he followed for 14 years. In 1831 he in company with Mr. Kelley and Richards, bought the Waterwitch for \$ 20,000 and after competing with the Hudson River line, in 1840 Mr. Drew formed a partnership with Newton starting the "Peoples line." When the Hudson River Railroad opened it was supposed that Mr. Drew would have to lay idle with his steamers, but such was not the case, the business of the cities had increased in such a way that both lines had plenty of work.

He chose his employees with the greatest care and an incompetent person was never tolerated. Some of the river boats, really floating palaces, were built at a cost of \$ 700,000.

In 1836 Mr. Drew entered into the banking business in Wall street, and in 1840 he established the banking firm known as Drew, Robinson, & Co. In 1855 he turned his attention to Railroad Stock, and invested largely in Erie stock. In 1857 he was elected director of the Erie Railroad Co., and was afterwards elected Treasurer. He still continues his operations in Wall Street, and although occasionally a heavy loser, is generally fortunes favorite. His property in 1868 was about twenty millions.

May the 9th, 1876. He was in his 79th year, had never been sick but since his bankruptcy of late, he was confined to his room on account of mental worry. He says that he ought to have retired from active life some 8 or 10 years ago when he was worth 8 or 10 millions.

but that money-making was so enticing to him that he kept at it until his late calamity overtook him, he repents not having made his family rich, and was ambitious to be as rich as Vanderbilt, whom he thought worth one hundred millions.

James B. Eads, born at Lawrenceburg, Indiana, in the year 1820. When 9 years old, his father moved to Louisville, and noticing the mechanical talent in his boy he was allowed the use of tools for the construction of his boats and sawmills. Later he obtained a clerkship in St. Louis after the death of his father, and having access to a library he studied with much interest, Mechanics and Engineering; after this he secured a clerkship on one of the River boats, and thus became fully conversant with the great river and its tributaries. In 1842 he organized a wrecking company. In 1845 he sold out, and in 1847 reorganized another company, and in 1857 the company was valued at half a million.

When the war broke out, he took the contract in 1861 to build 7 gunboats, in 65 days, for service on the Mississippi, against the Rebels, which contract he fulfilled. After this he took other contracts, among which were some turreted gunboats, a modification of the Ericson turret. In 1868 he had matured plans for building the St. Bridge. The stock of his company about 4 millions was principally sold in England.

Cyrus W. Field, born in Stockbridge, Massachusetts, in the year 1819. He was the son of Rev. David Dudley Field. When 15 years old he entered a mercantile house in New York, where he was soon promoted from clerk to partner, and in 1853, when 34 years old, he had achieved his independence, and he retired from business. For the sake of recreation he undertook a journey to South America. When he returned, that same year, his

brother Mathew D., a distinguished engineer, laid before him the plan of Fred. N. Gisborne of Newfoundland, for laying a cable between New York & Newfoundland and to connect the New- and the Old World with a line of the swiftest steamships. From this interview with Gisborne, he conceived the plan of laying a submarine cable across the Atlantic. Lieutenant Maury of the National Observatory, and Prof. Morse the inventor of the telegraph, expressed their belief to Field, of the possibility of the scheme. Maury had already made a report on the same subject, to the Secretary of the Navy, so that Cyrus W. Field found that he was not the first one to conceive the idea.

Mr. Field started now organizing a company, with a capital of one million. Five gentlemen pledged themselves to the scheme, and obtaining a charter from Newfoundland was immediately proceeded with. David Dudley Field was made legal adviser of the company, this obtained, the liabilities of the old telegraph company were paid off, which Mr. Gisborne wished to revive at the time he first met Mr. Field. In May 1854, the company was formally organized. A capital of one million and a half was subscribed on the spot, and Mr. Field contributed two hundred thousand dollars in cash. Work was commenced on the line from New York to Newfoundland, and it was in 1856 that success crowned the efforts of laying a cable across the Gulf of St. Lawrence; the first attempt in the preceeding year having failed and the cable was lost in the Gulf. The line 1000 miles in length, was now in working order, but it had consumed one million of dollars.

It now remained to complete the line across the Atlantic. The American and British Government were solicited to make deep sea soundings, for determining the outline of the ocean bed, which was promptly complied with and the result encouraging, Mr. Field proceeded

now to England, to consult with men of learning, and published in the English papers the experiments of Morse and Maury, when the attention of the English public was finally gained. Her Majesty was next appealed to for aid by Mr. Field, and this was promptly granted. He now endeavored to raise a capital of three hundred and fifty thousand pounds and succeeded within a few weeks and having organized the company, he started for the new world to arrange matters with the Government. Here he just succeeded in securing an appropriation. In 1857 the cable was ready for laying. The steamships "Niagara" of the U. S., and the "Agamemnon" of Great Britain, took the cable on board, at Liverpool and London. Starting from the harbor of Valentia, the Niagara, with Morse and Field on board, started for the sea. At a distance of 5 miles the heavy shore end was caught in the machinery and broken. This spliced, the ship moved ahead, but when about 200 miles out at sea and beyond the submarine mountain, the cable was broken in an attempt to prevent its paying out too fast, which had taken place at the rate of 6 miles an hour, while the headway was but 4. The ships were obliged to return to London and store away the cable for the present.

In March 1858 all was ready for a second attempt to lay the cable. The plan was to commence dropping the cable at mid ocean. June the 25th, the ships had reached mid ocean. The next day the splice of the two cables was made, and the ships parted for their respective shores. Before they had gone 3 miles the Niagara broke her cable. A second splice was made and they proceeded, but when gone about 40 miles the cable broke a second time. A third splice was made, but before the ships had parted 200 miles the cable was broken a third time, and the laying of the cable had to be given up a second time.

The persuasiveness of Mr. Field succeeded in inducing another attempt to lay the cable. The rendezvous was reached on the 29th of July, and the splice was made; the Niagara reached Trinity Bay Newfoundland, on the 5th day of August, and the Agamemnon a few hours later the same day.

Signals were sent across the line, from shore to shore with rapidity. After working 4 weeks however, the electric current suddenly stopped. —

In the year 1863 the success of the laying of a cable across the Mediteranean and Persian Gulf stimulated Mr. Field to renew his efforts. In 1864 the subscription of 600,000 pounds was secured and a new cable immediately begun. In July 23rd 1865 the Great Eastern started with the cable on board, all went well until 1,200 miles of the cable had been paid out, and 600 miles from Newfoundland, when the cable broke and fell into the ocean. Grapnels were sunk to the depth of 200 miles, and the cable was caught several times, but could not be brought up. Buoys were left to mark the spot. — It became now necessary to organize a new company to raise funds. "The Anglo-American Telegraph Company," with a capital of 600,000 pounds. On the 13th of July, 1866, the Great Eastern again set out with a cable on board for Newfoundland, and completed the voyage in 14 days time. The slack of the cable was about 12 per cent, showing that the cable was laid in a straight line, allowing only for the swells of the sea bottom. On Friday July the 27th, the cable end was safely on the shore of "Heart's Content."

The Great Eastern then proceeded to the spot where the former cable was dropped, grappled the same, spliced it and succeeded in laying it successfully, so that both cables were in working order. By this case we are reminded of the fact that great undertakings arrive at success only through the course of repeated failures. The

obstacles that beset anything new are numerous, unforeseen, overlooked, or undervalued. The time consumed is generally ten-fold that what was calculated on, and still we are taught by it, that attending to all the minutiae in accordance with reason, would have secured success the first time.

Robert Fulton was born in Lancaster County, Pennsylvania, in the year 1765. He was of Irish descent. While young he exhibited a great love for machinery & drawing, and when a boy of some 17 years, he constructed a pair of paddle-wheels, worked with a crank, for his neighbors fishing boat on the Conastoga River.

Removing to Philadelphia at the age of 17, he undertook to learn portrait painting, and remained there until 21 years of age.

He next went to England, where he got under the influence of the Duke of Bridgewater and was persuaded to drop painting, and enter the field of civil engineering. His inventions were some canal improvements and with a design to introduce them into France, he started for that place in 1797, and remained there 7 years. In 1801 he invented a submarine boat, called the "Nautilus," but he could not sell it to any of the Governments he applied to. Fulton turned his attention now, in face of the many failures witnessed, towards applying steam to the propulsion of boats.

He associated himself with Robert R. Livingstone with whom he got acquainted in Paris, and who had already obtained the exclusive right to navigate the waters of the state of New York by steam in 1798. A boat was built for trial on the Seine, which after a small failure, proved successful, this was in the year 1803.

Fulton and Livingstone determined now to build a boat on a larger scale, to navigate the waters of New York. A steam engine was ordered from Watt & Boul-

ton in England, and the building of the boat was immediately commenced. To raise sufficient capital one-third of the monopoly was sold. The steam-engine ordered from Watt's and Boulton was received in 1806, and the next year the boat was launched. The boat named the "Clermont" was 130 feet long, 18 wide, and 7 deep, capable of carrying 160 tons.

In August it made its first trip up the Hudson, with perfect success and since then steamboats have never been off from its waters. Very soon the boat met with formidable opposition, from the side of the sailing vessels, who occasionally attempted to sink her by running into her.

1811 and 1812. Fulton built two ferry boats for the North River, and soon added a third for the East River. In 1814 Congress authorized the building of one or more floating batteries after the plan of Fulton, which made its first trip the 4th of July, 1815. It cost one-third of a million.

The patents Fulton took out in the year 1809 and 1811 were limited to the adaptation of paddle-wheels to the axle of the crank of Watt's engine. An Albany Company formed, and the monopoly of Livingstone and Watt's was denied, and before the litigations were ended Watt caught cold and died February the 24th, 1815.

— Here we have a great achievement, which consisted in bridging over the great gulf between experiment and actual achievement, of rearing the tender plant into a fruit bearing tree, at first ridiculed, next combatted, by those who thought their business interfered with, next it was invaded by others who thought it profitable. Litigation consuming a good share of the profits.

Charles Goodyear, born at Newhaven, Connecticut, in the year 1800. When of age he entered the hardware

business in company with his father and a brother, at Philadelphia, when the crisis of 1836 was drawing near, the house failed and went into bankruptcy. At that time Mr. E. M. Chaffee of Boston, the foreman of a patent leather manufactory, conceived the idea of making India Rubber cloth. The gum had been discovered by a party of French astronomers, sent to Peru, South America, for scientific investigations; it being the concreted juice of a tree. The natives manufactured some rude articles out of it. In 1730 it was used in Europe for erasing pencil marks. In 1823 a merchant imported 50,000 pair of rough shoes made of it, from South America. — Mr. Chaffee dissolved his gum in turpentine and added lampblack to give it a bright black color, and in this condition spread it on cloth.

In 1833 a company was organized, called the "Roxbury India Rubber Company," with a capital of \$30,000. The success of the company was complete, and other companies formed in Boston, Staten Island and other places. However the goods made in 1833 and 1834 were made in the cold weather, and when warm weather approached, the goods melted and emitted an offensive smell. Twenty thousand dollars worth was thrown back on the hands of the Roxbury Company alone. India rubber stock fell rapidly, so that 2 years later not a solvent company existed in the Union, and 2 million of dollars had been sunk. Charles Goodyear now stepped into the salesroom of the Roxbury Company and bought a life-preserver for examination, and commenced his experiment in the winter of 1834 and 1835. The gum had fallen to the price of 5 cents per pound. These experiments amid poverty and beggary, were continued for 10 years, before his efforts were crowned with success. In 1835 he found that aquafortis dropped on India rubber cloth had the effect of modifying it so that heat did not make it soft, but 150 mail bags constructed of thick ma-

terial proved ruin to him.

Nathanial Haywood, foreman of the Roxbury Company, told Goodyear that he hardened the rubber by sprinkling sulphur over the same, before drying in the sun. This was in the year 1839. He immediately set out making use of sulphur, and after heating the same artificially, he found that it would soften no more by heat. His brother in law, M. De Forrest advanced forty six thousand dollars in the last stage of the invention. The invention was complete in 1844. However he was not destined to profit by his invention. The French Government declared his patent invalid. In England Thomas Hancock had registered the patent of Goodyear in May the 21st 1844, and Goodyear's patent was therefore a few days too late. In America his patents were constantly infringed and violated. In 1860 he died in New York, insolvent, leaving his family a heavy debt. The extension of his patents to his widow was also refused by Congress. — He was defrauded of the immense wealth his inventions produced.

Remarks. —

Charles Goodyear is another instance of miscalculation in regard to the time and money required for maturing an invention. He strongly contrasts with C. W. Field, while the latter moved in palaces and affluence, to bring his inventions to perfection the former moved in despised India rubber suits, in the haunts of misery and starvation. Both consumed 10 times as much time and money as they ever dreamt of.

All things that are great are a multiple of things small, and where there is one thing great, there must be one hundred thousand things small alongside of it. Now great things are the result of growth, of an agglomeration, going on for centuries, and on this growth thousands of individuals labor and die, till finally one man or a number of them becomes heir to it, that is it falls to

their lot as if by inheritance, or they may even have to use strenuous efforts to seize it. Still the invention or the great thing whatever it was, would still have come to the lot of man, although it might have taken place a little later. The chick will break from its shell without the assistance of the mother, although she may facilitate its issue. Just so with the Goodyear process, so with the electric telegraph, so with the steam navigation. These inventions were conceived in an embryonic stage thousands of years before they became mature, before they issued forth from the matrix of experiment, into the world of actual achievement. Field, Fulton, and others were the guardians to see the invention become of age.

Inventions and fortunes cannot be made, they depend upon a happy coincidence of a man with a great thing; and if no efforts were made whatever, still it would fall to the lot of some man to make the invention, or acquire the fortune. While thousands labor hard to make an invention, and spend ever so much money, without reaping any reward, and which are never brought to the notice of posterity.

The cataract of time representing the present brings constantly new fish here and there a large fish passes down, if now every foot of the bridge in front of the cataract was beset with some individual with a net, so it would be only a matter of chance who would have the large fish, but each person has a certain latitude in which he can move his net to either side, and thus it happens that many a one loses his large fish, that he might have caught, if he had been vigilant and diligent. Just so it is with man in life. A fortune cannot be made when and where you please, but circumstances may be ripe in some line or other, within your reach, which made use of would lead to fortune or a great discovery. But while this is so, there must evidently be a great many that

may be classed with children, that are unable to grasp the golden opportunity even if it was presented to them. The inequality of men makes it possible, and fortunes can be made only among a certain class of men, among the others it is impossible.

In order to make a fortune, an education is necessary. Sometimes a practical education is all that is wanted, but more frequently a theoretical education is also necessary. It is necessary to follow something for a living, to be catching the small fish from the bridge, and when enough have been secured, then a part of the time may be devoted to looking about, to prospecting for something great, but keeping the old business always as a fortification: as something to fall back on. —

The flow of fortunes is constantly going on, day by day, and is created and determined by the flow of mankind, by its indomitable growth and progress, surely the same days will never return that a child has passed, but other days equally as good. Just so the opportunities for fortunes of a Girard and Astor will not return, but other chances equally as well, though they may be different in kind. The making of fortunes may be divisible into ages lasting for a number of years, in which fortunes can be made, and after that age is passed, another age will be inaugurated. Thus we have the age of war when Rome used to plunder the world; the age of shipping, when the Indians were searched for their species; the age of silver mining in Peru and Mexico; the age of gold mining in California, now near its vane; the age of steam, of India rubber, of Ginseng, Whiskey, Wine, Medicine, and a thousand others. While a certain article be it whatever, becomes of age, it will be milked by everybody that is able, but after a great many have entered the field, then competition becomes so great that nothing can be made any more in that line. Look at the oil wells of Pennsylvania at present. Where ever

there is a profitable employment, dishonest men will assemble, thinking they can steal something, if they cannot get it honestly.

The same is true in regard to the American Government, the making of money honestly is played out, and robbers and knaves have entered the arena. After one age is gone, which will last from one hundred to a thousand years, then another age will succeed. The age of the whale oil is gone, we have that of the coal oil nearly over us, and are about to enter that of electricity for illuminating and heating purposes. We are in the age of railways.

As the human race goes ahead, the faction to obtain a great result becomes constantly more gigantic, the single man is hardly able to cope with them, large corporations are required, the aid of the Nations credit by the Government. Millions of dollars are required to mature a single grand affair. This agglomeration is constantly proceeding. Greater stores are to be unveiled, and greater factions are required to unveil them.

But as the monera is probably evolved at this day, as well as a quarter of a million of years ago, just so, fortunes are running through their embryonic stages at this very day. The chances in real estate go with the growth of the people, and are intimately ligated with it; so here we have fresh starts, on the side of the strong factions of former ages, when the capitalist, in a measure reaps the largest profits. But since factions have their lives the same as individuals and die after a while, so it happens that other persons get a chance. —

To acquire a fortune can only be accomplished by the right person to sieze upon the right thing, in the right time and in the right place. A concomitance of circumstances are necessary, that are hard to bring together, requiring extensive knowledge. The person must know his power, he must know how hard he can work, and

about how long he may live. He must know the business of the world, he must know what grand future is maturing suited to his capacities, he must know the place where to commence his operations, and he must know when the proper time is for commencing.

The capacities of a man however amount to nothing, they must also be applied, the Idea must be transformed into the Ideal. Many men may have the proper learning, strength and health, but may lack the energy to make the application, hence energy is another element achieving the application. Hence fortunes be in the application of the proper person to proper things in the right place and time.

— Large factions are hard to maintain, thus bankruptcy and dissolution often occurs among them.

Eli Whitney was born at Westborough, Massachusetts in the year 1765. He graduated at Yale College, in the year 1792, and left for Georgia to assume the situation of a teacher. When he reached Georgia the situation was gone and he was obliged to take abode with Mrs. Green, the lady of General Nathaniel Green of the struggle for Independence.

Here he was informed that cotton planting was about to be relinquished on account of its unprofitableness, solely due to cleaning it of its seed. A negro was able to clean but a single pound per day by hand.

Whitney set to work in the cellar of Mrs. Green constructing a model of a machine that would clean cotton with dispatch and economy. When the model was about completed, the cellar was broken into at night, the model carried off and copied, and although he recovered his model, its principle was divulged and machines were in operation before he could get out his patent. However he associated Mr. Miller, a man of means with him

to go into the manufacture of the machines. In May 1793 Mr. Miller and Whitney removed to Connecticut to put up a factory for the manufacture of the cotton gins; thinking themselves sure of the protection of the U. S. The demand for the machines were at first great, but owing to the simplicity of its construction, every mechanic was able to make one after he had examined the model. The temptation to dishonesty proved too strong for the cotton states, and thus the machines were turned out fraudulently by the hundred.

Suits against the infringers were of no avail. It was almost impossible to find a jury that would give a verdict in his favor, in any of the States of the South. Georgia asserted that Whitney was not the inventor of the cotton gin, but somebody in Switzerland.

South Carolina gave him 50,000 dollars for the State using his inventions, but still he had to go to law to get it. North Carolina acted more nobly and granted him a percentage on each saw for 5 years, promptly collecting the amount and paying it over to the inventor. For 14 years he continued to manufacture his machines, but to no advantage to himself, he merely earned his support. In 1807 Whitney's partner died, and the factory was destroyed by fire. In the same year the patent expired, and not being able to have it renewed, he abandoned the manufacture of the gin. While the invention proved to be of no value to Whitney, it proved to be of immense value to the south. In 1793 the export of cotton was 10,000 bales, in 1860 it was over 4,000,000, also 400 times as much, bringing to the South hundreds of millions of dollars, and thus was the posterity of the South before the breaking out of the war, due to the invention of Whitney.

Whitney turned his attention next to the improvement of the old Springfield musket, where he succeeded very admirably. He established an arm factory, first at

New Haven and afterwards at Whitneyville, Conn., and engaged to furnish to the Government, at first 10,000 and afterwards 30,000 stands of arms.

He was the first to carry the division of labor into this department, where one man was making but a single piece. His success was marked and rapid, and when he died in his 60th year at New Haven, 1825, he left his family a handsome profit.

April the 14th, 1876.

Chauncey Jerome was born at Canaan, Connecticut, in the 1793. When 15 years of age he was apprenticed by his guardian to a carpenter to learn the trade. When 17 he was allowed in dull times to go home, and engaged with 2 journeyman clockmakers to travel with them and make the clock cases for them. Success crowned the venture. When spring came he returned to his master to complete his apprenticeship.

In 1814 he set up a carpenter shop for himself and the next year he married. In 1816 he engaged to work with Mr. Terry the wooden clock maker, at a liberal compensation. A clock would bring 15 dollars at that time. In 1817 he felt himself able to make clocks on his own account. At first he bought the works, put them together and made the cases for them. When his business increased, he discovered that the wooden works were apt to get damp and swollen, especially if shipped to a great distance, and thus rendered useless. While pondering how to remedy this defect, it occurred to him that the works might be constructed of brass, as cheaply as of wood. Before carrying out his idea, it became necessary for him to invent the clock making machinery, which has made him famous among American inventors. By this machinery six men can make works for 1,000 clocks a day, and the total cost of producing a good clock of

small size is 40 cents. American clocks then became famous the world over, they were sent to China, the East Indies and South America.

After a few years of successful business he organized the "Jerome Clock making Company," of New Haven. It began business with a large capital. In a few years Jerome retired from active management of the company, but remained its nominal president.

He built himself a nice mansion and enjoyed himself in the presence of his family and friends, and hoped to pass the remainder of his days here. — However through some mismanagement on the part of the company, it became involved, and in 1860 before Jerome was fully aware of the trouble, the crash came, and the company was ruined. Every cent of Jerome's property was taken to meet the liabilities, and he became a poorer man, then he had been when a carpenter. At 67 years of age he had to look about again to earn his daily bread. The great Chicago Clock Company of Chicago engaged him at liberal wages to superintend their factory, which position he still holds. The clocks of his own genius are manufactured here.

Elias Howe Jr., was born in the Town of Spencer, Massachusetts, in the year 1819. He was rather weak and delicate in constitution, and while a boy he worked in his father's mill. At 21 he married, and his family rapidly enlarging, he had to work hard to gain a livelihood for them. In 1843 he began to think about inventing a sewing machine. He knew about the dangers besetting inventors, and so he kept his own counsel. The year after he came to the conclusion that the movement of the machine need not be in imitation of that of the hand. It became apparent to him that there must be another stitch. A little later he conceived the idea of

using 2 threads, forming a stitch by a curved needle and shuttle. This was the triumph of his skill. In 1844 he had a model constructed of wood and wire which operated to his satisfaction. As he was lacking 500 dollars to construct a perfect model of iron and steel, he formed a partnership with George Fisher, a man of means, and disposed one-half of the patent he should obtain, for the requisite aid. In 1845 in July, the model was completed. After the machine was patented, it was sought to be introduced; but the tailors would not invest a dollar in it, being afraid it would ruin their trade. Fisher became disgusted and withdrew from the partnership. Howe also abandoned his machine for the time. In 1846 he tried his success in London, but falling short, he was obliged to return to America.

On his return he found that unscrupulous mechanics had constructed fac similes of his machine, and that it had been introduced into important manufacturies. Thus he commenced suits against the parties in 1850 which were finally decided in his favor by Judge Sprague, in 1854.

In 1850 he had moved to New York; associating himself with Mr. Bliss, whose whole interest he bought in 1855, who had died by that time. His business commenced growing now from an income of 300 dollars a year, until it reached one-fifth of a million per annum. In 1867 when his patent expired he had made 2 millions on his inventions. He died that same year at Brooklyn.

Richard M. Hoe was born in the city of New York, in the year 1812. His father had already made an improvement on the Napier press, and when obliged to retire from business in 1832, young Richard formed a partnership with his brother Robert, Mr. Newton and his cousin Matthew Smith.

Richard's first machine that he produced was the "Hoe Double Cylinder Press," making 6 thousand impressions per hour. This press became rapidly introduced. Very soon however it became necessary to turn out larger editions of papers, in a comparatively short time. In 1846 it occurred to him to arrange the type on a circular roller, and thus the germ of his lightning press was conceived in his brain. He rapidly constructed a model, and obtained a patent for his invention. Mr. Swain of the Baltimore Sun ordered the first 4 cylinder press, which was completed in the year 1848, making 10,000 impressions per hour. These presses were readily introduced. In 1858 Mr. Hoe purchased the rights of the Adams press of Boston, carrying on the manufacture of that press also. One and one-half million of dollars are invested in these 2 establishments.

A ten cylinder press is worth 50,000 dollars, its length is 40 feet, width 15, and height 16 feet. The type cylinder is four and one-half feet in diameter, one-fourth of the surface being occupied by the type, the remainder being used as an ink distributing surface. The 10 cylinders are impression cylinders, and each one requires a man for feeding in the paper to be printed. One man can feed 2,500 per hour, hence a 10 cylinder press can turn out 25,000 copies per hour.

Samuel Colt was born at Hartford, Conn., in the year 1814, and died 1862. When 15 year old he conceived his revolver, and constructed a model out of wood; when 18 he went lecturing and realized a handsome sum for 2 years. He commenced now to work in earnest at his revolver, and when 21 years of age, (in 1835,) he had brought it to such perfection that he was ready for applying for a patent. His application was successful. While examining the collection of firearms in the Lon-

don Tower, he was surprised to find that the idea of a revolving chamber had been conceived anterior to him, although the idea had been poorly carried out. After having secured the patents of the United States, and the principle countries in Europe, he formed a company in 1835 with a capital of 300,000 dollars, called the "Patent Arms Company," at Paterson, New Jersey. His invention received little encouragement until the war in Florida broke out in 1837, when the Government consented to give the revolver of Colt a trial. Its success was so marked, that the Government gave further orders for them. The revolver played such a successful part in the war that the Seminoles became disheartened, and the war was terminated.

This termination, brought the demand for firearms also to an end; and Colt was obliged in 1842 to wind up the affairs of the company. In 1847 the war with Mexico began and thus a new demand was created. The Government ordered 1,000 weapons, and agreed to pay \$ 28,000 for them.

Colt not having a model left, went to constructing a new one with some improvements. He hired an Armory and when the arms were ready, and their success apparent, new orders kept pouring in on him. At the close of the war, the demand for his revolvers did not fall off as it had done before, but kept on increasing. Everybody going to California and Australia, purchased a revolver.

In 1851 he commenced operations on a most extensive scale, and in 1861 he doubled the size of the armory, being able to turn out one thousand stands of arms per day, being the largest armory in the world, costing two million. His machinery for making arms, was adopted by several Governments, especially England and Russia.

Samuel F. B. Morse was born at Charleston Massa-

achusetts, in the year 1791, and graduated at Yale College in the year 1810. At first he devoted himself to sculpture and portrait painting in London, having for his teachers Allston, West and Colley. Returning to America, he met with poor success. He went again to Europe in 1829 to complete his studies in art. In 1832 he was elected professor of the literature of fine arts in the University of N. Y. C. While on his way home one of the passengers related some experiment he had witnessed in Paris, with the electro-magnet. Mr. Morse listened with intense interest, and before he reached New York he had conceived the principle of the electric telegraph, and completed the drawing thereof. Assuming the duties of professorship he was unable to complete his recording instrument, rude as it was, until 1835 messages were sent through half a mile of wire. In 1837 he completed the duplicate instrument, and filed his caveat in the Patent Office. In 1840 he received his first patent, and it was not until 1843 that Congress could be induced to make an appropriation for an experimental line. At that time 30,000 dollars were appropriated for Morse to complete his experimental line from Washington to Baltimore. This was finished in 1844, proving quite successful. In 1842 he had already laid a submarine cable across the harbor of New York.

Telegraph companies organized now over the United States adopting the invention, and since the Telegraph Interest rapidly increased, Morse was soon put in possession of a large fortune. Many of the foreign potentates send him costly presents as a recognition of his services, and nearly every American scientific or art academy made him an honored member. Yale College gave him the title of L. L. D. At his eightieth year he was living at Poughkeepsie, New York State, in the perfect enjoyment of his faculties.

Harper Brothers. —

James Harper was born in the year 1795, at Long Island. When 15 years of age he chose to become a printer. When through with his apprenticeship he associated with his brother John, and commenced business for themselves. At first they only printed books to order, not attempting anything at their own risk. Their first job was 2,000 copies of Seneca's morals. In 1818 they printed "Lock's Essay upon the human understanding," on their own account.

When contemplating the publication of a book, they would first send to the leading booksellers of the country, asking them how many copies each one would take. Joseph and Fletcher were taken into partnership in 1823 and 1826.

They employed 50 men and 10 hand presses, printing books in every department of knowledge. In 1850 they commenced the publication of "Harper's New Monthly Magazine," and in 1857 "Harper's Weekly," the former having attained after 20 years, a circulation of 180,000 copies, and the latter a circulation of 100,000 copies. In 1853 a workman through carelessness set their building on fire, which proved a loss of a million to them, one-quarter of which was covered by insurance. Their new structures were built fireproof. They employ 43 Adams press for book work, and 5 cylinder presses for printing the Weekly and Bazar. About 600 hands are here employed, 250 of which are females. In 1869 James while driving in the Park in company with his daughter, was thrown out upon the pavement, which brought about his death in 2 days.

James T. Field was born in the year 1820, in Portsmouth, New Hampshire. In 1834 he entered the book store of Carter and Bender. The firm soon changed to Allen and Tickner. In 1846 he became partner of the

firm, which changed then to Tickner and Fields.

James Gordon Bennett was born in Scotland, in the year 1800. In 1819 he came to America. In New York he tried to start a commercial school, but he did not succeed. In 1825 he purchased the "New York Courier," but he did not succeed with it. In 1826 he formed a connection with the "National Advocate," but this changing hands in 1827, he had to give up his position. In 1828 he and Mr. M. M. Noah established the "Enquirer." In 1829 he became associated Editor of the "Courier and Enquirer," which had formed a consolidation. This paper he left in 1832 and started the "Globe," but it met with no support, and went down after 30 days existence. In Philadelphia he invested his means in the "Pennsylvanian," but his paper failed after a short and desperate struggle. In 1835 he returned to New York and associated himself with two journeyman printers, and started the "Morning Herald" a penny paper, the progenitor of the "New York Herald" of to day. At that time the Herald was a four page sheet of four columns a page, and printed in a cellar. He wrote most of the articles himself, and tried especially to produce something to make the people laugh. Next he introduced the "Commercials" for the first time in the American papers. This new feature proved very successful, and brought about a greater circulation of his paper. The great fire however that swept over New York, brought him material for his paper. At the close of the 15th month, the paper was enlarged, and the price increased to two cents per copy. The "New York Herald" of to day is from twelve to sixteen pages, of six columns each in size; is printed in a five story marble building. It employs 12 editors, 35 reporters, and 453 other employees engaged upon the Herald.

Its editions have a circulation of about 12,000 copies.

He rarely writes for the paper now, but decides on the topics to be written upon in the presence of his editors, and in his absence, his son Gordon Bennett Jr., takes his place. When his marble building was completed, he had yet one-quarter of a million in the bank.

Robert Bonner was born in the year 1824; in the north of Ireland. He was brought up in the State of Connecticut; and in the office of the "Hartford Courant," he took his first lesson in type setting. On one occasion when the President's Message was to be published in advance of rivals, he set up as much as 1,700 ems an hour—a feat unparalleled. In 1844 he moved to New York and engaged work in the "American Republican," and when this paper suspended, he took employment in the office of the "Evening Mirror," and soon after took charge of the "Merchant's Ledger," which he purchased a short time after. Fanny Fern having become the topic of the day, he secured her services by paying 100 dollars a column for a story of 10 columns, and this fact was heralded throughout the Union in a dozen reiterations, making the editor ridiculous in the eyes of the people, but it paid. When Mr. Everett was assisting the ladies to buy the Mount Vernon property, Mr. Bonner offered him 10 thousand dollars for writing a series of papers for the "Ledger," which was accepted. He next engaged Henry Ward Beecher, to write for the Ledger, for which he made princely payments. When Newspapers sneered at the Ledger, he procured articles from the best Journalists of the day, as James Gordon Bennett, H. J. Raymond, and Horace Greeley, and thus effectually silenced the scoffers.

When it was said that the Ledger was not fit for young persons to read, he engaged the services of 12 of the Presidents of the best colleges of the Union. The Ledger has

now a circulation of 300,000 copies. He is married and has a family, and he has 6 horses worth 200,000 dollars. When he drives out, he holds the reins himself.

John Marshall, son of Thomas & Mary Marshall was born the 24th of September, in Vauquer County Vir., intermarried with Mary Willis 1783, and departed life on the 3rd of January, 1835. In 1781 he was admitted to the bar, and in 1799 he sat in Congress. In 1801 he was appointed Chief Justice of the United States, which office he held for more than 34 years. In 1805 he published in 5 vols. the life of Washington.

James T. Brady was born in New York, in the year 1815. In the year 1835, young Brady was admitted to the bar. His head was twenty four and three-eight inches in circumference. By religion he was a Catholic, he was never married. In the year 1869 he died of apoplexy.

Benjamin West was born in Springfield, Pennsylvania, in the year 1738. He was a great painter, and was made President of the Royal Academy of London, in about 1803, which position he held until death. His paintings were about 3,000 in number, and would cover a wall 16 feet high, and a quarter of a mile in length. He died in London in his 82nd year in 1820.

John Rogers to whom the world is indebted for the plaster of Paris statuary, was born at Salem, Mass. in the year 1829. On one occasion he observed a boy moulding a figure in clay, and was induced to experiment in that direction. In Chicago his first fruits in clay, were exhibited at the fair.

The process is as follows: — The artist takes some wet clay, and shapes it with his hand. The rough figure is then finished with the moulding stick, which has

a little boxwood spoon at each end. When the model is completed a plaster counterpart is taken, which is scrupulously finished, and from this the moulds are made. The moulds are made of glue and when sufficiently dry are cut into the necessary pieces with a knife, for the reception of the cast. He married in 1865, and is still living in New York.

Hiram Powers was born at Woodstock, Vermont, in the year 1805. He chose sculpture as a profession, and in 1837, he sailed for Florence, Italy. His Greek slave was well thought of. Living beings are used for models. The cheapness of labor and life, have induced him to remain in Italy, where he is now more than thirty years.

Emanuel Leutze was born in Wuertenburg, in the year 1816. In his childhood he was moved to Philadelphia, and he chose painting for a profession. In 1860 he received a commission to decorate the marble stairways of the Capitol at Washington, for which he received 20,000 dollars. July the 18th 1868, he died at Washington City, of apoplexy.

Henry Ward Beecher was born at Litchfield, Conn., in the year 1813. His father Lyman, was a Presbyterian divine. In 1832 he and his father moved to Cincinnati. When young Henry was ordained, he got married, and soon after became active at Indianapolis, Indiana, where he remained 8 years. In 1847 he took charge of Plymouth church, Brooklyn New York. He preached about Christ, not as a bygone personage, but as a reality, living yet and forever among us. The anti-slavery and temperance movement he considered as an emanation of Him. He helped to establish the "Independent" and the "New York Ledger," and he wrote "Norwood a story of New England life." His "Life of Christ"

brought failure lately upon his publishers.

Peter Cartwright a native of Virginia, was born in the year 1785. In 1801 he was formally received into the Methodist Episcopal Church. While yet a boy he was induced to preach to the backwoodsmen, and since churches were scarce, gatherings were held in the woods and thus originated the camp meeting system. In his congregation the "Jerks" originated, and as much as 500 persons would take the Jerks at once, and commence to dance to get rid of them. These Jerks would seize a person from top to toe. This took place in Kentucky in 1804. In 1806 he was ordained Deacon of the Church. In 1823 he moved to Illinois, to Sagamon County, where numerous Indians used to roam at that time. Here he labored for 46 years. In 1827 he was made presiding elder. He had the whole of the State to attend to, which distance he traveled 4 times a year. He was a great temperance advocate. His strength and agility were such that he would not shrink from a hand to hand engagement. 76 years have passed since he began his preaching, and age has not subdued his zeal or dimmed his eye, and he labors still in the cause of his master.

Henry W. Longfellow was born in Portland, Maine, in the year 1807. In 1826 he was appointed professor of Modern languages in Bowdoin College, and in 1835 he was appointed professor of languages in Harvard College. In 1840 he published the "Voices of the Night." "Ballads and Poems" appeared in 1841. In 1854 he resigned his position in the University. In 1861 his 2nd wife was burnt to death from having her clothes take fire.

Edwin Booth was born near Baltimore, Maryland, in the year 1833. In 1849 he appeared first on the stage, in 1852 he went to California, in 1854 to Australia, and

in 1859 he returned to New York. His career as an actor was brilliant.

Joseph Jefferson was born in Philadelphia, in the year 1829, he was brought up on the stage. In the exercise of his profession, he acquired a large fortune. He resides in New Jersey on a nice country seat at present.

Benjamin Rush was born near Philadelphia, in the year 1745. He graduated at Princeton College in 1860, at the age of 15. He then proceeded to study medicine at Philadelphia, visited London, Edingburgh and Paris, and commenced the practice of medicine in 1769.

In 1770 he began to write on medical subjects. In 1776 he signed the Declaration of Independence. In 1777 he was made Surgeon General of the Continental army. In 1785 he planned the Philadelphia Dispensary and in 1789 he was made professor of the Theory and Practice of Medicine, in the Philadelphia Medical College, which latter was merged into the University in 1791. He held 3 professorships at the time of his death. When the Yellow fever broke out, he instituted a new form of treatment, which gave rise to his denouncement by William Cobbett, which was followed by a lawsuit, where Cobbett had to pay 5,000 dollars. He died in the year 1813, at the age of 68, leaving one son.

Valentine Amott was born at Glen Cove, Long Island, in the year 1785. At the age of 21 he graduated as M. D. at the Columbia College, New York. He continued his studies in London, Edingburgh and Paris. In 1809 he accepted the chair of Surgery in the Columbia College, and held it until the year 1813, when this College was merged into the College of Physicians and Surgeons, in this he held a professorship until 1826. He

was the first to introduce into this country the practice of delivering clinical lectures at the bedside of the patients. In 1318 he ligated for the first time in the world the brachiocephalic trunk of the arteria innominata, and while thus the blood was cut off from the arm, the pulsations continued and also the vitality of the limb. Secondary hemorrhage killed the patient after 28 days. At one time he removed a piece from the internal jugular vein, tying the ends.

His invariable rule was: before attempting an operation on a living body, to perform it on the Cadaver, under the most minute and patient examination. He was always prepared to meet with unforeseen accidents, and did not suffer himself to be taken by surprise. He died in the year 1865.

P. T. Barnum was born in Connecticut in the year 1810. For a while he acted as a clerk in a store, or as a drummer for others, and finally turned out a showman. He inaugurated the extravagant advertisements, so wide spread in our time. He played on the weakness of the people, evinced in their love for the marvelous and extravagant.

"Never hide your light under a bushel" was his motto. The want of truth in his advertisements, blasted his reputation as the greatest humbug showman in America. He was however a man of pluck and scrutiny, always watching the cravings of the people; his habits were temperate. In 1836 he connected himself with Turner's travelling Circus, as a ticket seller, at twenty dollars a month. In the year 1841 he purchased the American Museum without a cent, and in a short time paid for it. He harnessed an elephant to a plow as an advertisement to his museum.

His riches had increased from day to day while a showman, but getting in the way of the Jerome Clock

Company, he was induced to bite, and down went his fortune with a crash. This happened while he was engaged in building a city in East Bridgeport, in 1855 he lent his name for 110,000 dollars as security to the clock company, which was to move to East Bridgeport.

Next he turned to lecturing and his article on money getting involves the following principles: —

• Expend less than you earn.

• Franklin's sayings.

Do not save at the spigot, and lose at the bung-hole.

Tend to your health. Avoid tobacco and drink. Follow that occupation you are best suited for. Persevere. Be cautious yet bold. Never have anything to do with an unlucky man or place. Use the best tools.

• Be hopeful and yet not visionary.

Do not scatter your powers. Beware of outside operations. Do not indorse without good security. Advertise. Be polite, honest, charitable and don't blab. In 1865 the American Museum burnt down, insured only for 40 thousand dollars, while the collection was worth 400 thousand.

He built up a new Museum, and rose to wealth a 3rd time.